AN 08-40RC64-2

HANDBOOK OF MAINTENANCE INSTRUCTIONS

for

TARGET CONTROL RECEIVING EQUIPMENT

RC-64-T9

RECEIVED
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RESTRICTED

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Destruction of Abandoned Materiel in the Combat Zone

In case it should become necessary to prevent the capture of this equipment and when ordered to do so, DESTROY IT SO THAT NO PART OF IT CAN BE SALVAGED, RECOGNIZED, OR USED BY THE ENEMY. BURN ALL PAPERS AND BOOKS.

Means:—

1. Explosives, when provided.
2. Hammers, axes, sledges, machetes, or whatever heavy object is readily available.
3. Burning by means of incendiaries such as gasoline, oil, paper, or wood.
4. Grenades and shots from available arms.
5. Burying all debris or disposing of it in streams or other bodies of water, where possible and when time permits.

Procedure:—

1. Obliterate all identifying marks. Destroy nameplates and circuit labels.
2. Demolish all panels, castings, switch- and instrument-boards.
3. Destroy all controls, switches, relays, connections, and meters.
4. Rip out all wiring and cut interconnections of electrical equipment. Smash gas, oil, and water-cooling systems in gas-engine generators, etc.
5. Smash every electrical or mechanical part, whether rotating, moving, or fixed.
6. Break up all operating instruments such as keys, phones, microphones, etc.
7. Destroy all classes of carrying cases, straps, containers, etc.
8. Bury or scatter all debris.

DESTROY EVERYTHING!

★

Unsatisfactory Report

For U. S. Army Air Force Personnel:

In the event of malfunctioning, unsatisfactory design, or unsatisfactory installation of any of the component units of this equipment, or if the material contained in this book is considered inadequate or erroneous, an Unsatisfactory Report, AAF Form No. 54, or a report in similar form, shall be submitted in accordance with the provisions of Army Air Force Regulation No. 15-54, listing:

1. Station and organization.
2. Nameplate data (type number or complete nomenclature if nameplate is not attached to the equipment).
3. Date and nature of failure.
4. Airplane model and serial number.
5. Remedy used or proposed to prevent recurrence.
6. Handbook errors or inadequacies, if applicable.

For U. S. Navy Personnel:

Report of failure of any part of this equipment during its guaranteed life shall be made on Form N. Aer. 4112, "Report of Unsatisfactory or Defective Material," or a report in similar form, and forwarded in accordance with the latest instructions of the Bureau of Aeronautics. In addition to other distribution required, one copy shall be furnished to the inspector of Naval Materiel (location to be specified) and the Bureau of Ships. Such reports of failure shall include:

1. Reporting activity.
2. Nameplate data.
3. Date placed in service.
4. Part which failed.
5. Nature and cause of failure.
6. Replacement needed (yes—no).
7. Remedy used or proposed to prevent recurrence.

For British Personnel:

Form 1022 procedure shall be used when reporting failure of radio equipment.

SECTION I
GENERAL DESCRIPTION

1. GENERAL.

(See figure 1-1.)

a. PURPOSE.—Target Control Receiving Equipment RC-64-T9 is the receiving end of a radio remote control system which, with associated units, permits operation of a target airplane from either mobile ground or airborne control stations. The receiving equipment utilizes frequency modulation and bandpass filters with associated relays. It can control any three relay channels simultaneously.

b. RANGE.—The operating range of the equipment is 7 miles in the 35- to 40-megacycle band when used with Target Control Transmitting Equipment RC-65. The standard frequency is 38.54 megacycles (Frequency "A") with an alternate frequency of 35.3 megacycles (Frequency "B").

Note

The front panel of each receiver is marked for the particular frequency to be used. A receiver marked "FREQUENCY A" uses the 8885-kilocycle crystal and a receiver marked "FREQUENCY B" uses the 8075-kilocycle crystal.

c. POWER SUPPLY.—The primary source of power for the receiving equipment is 14 volts direct current, negative, grounded. It will safely operate in an 11 to 15-volt range. At 14 volts the current required is 8 amperes.

2. EQUIPMENT SUPPLIED.

The following table lists the equipment supplied.

Quantity per Equipment	*Name of Unit*	*Army Type Designation*	*Overall Dimensions (inches)*	*Weight (pounds)*
1	Radio Receiver and Selector	BC-617-T2	14 x 22 x 9	35
1	Relay Unit — includes	BX-418-Z	7 x 4½ x 8	7.75
	Mounting	FT-440		0.05
1	Relay Unit	BC-622-AZ	7 x 7 x 2½	4.5

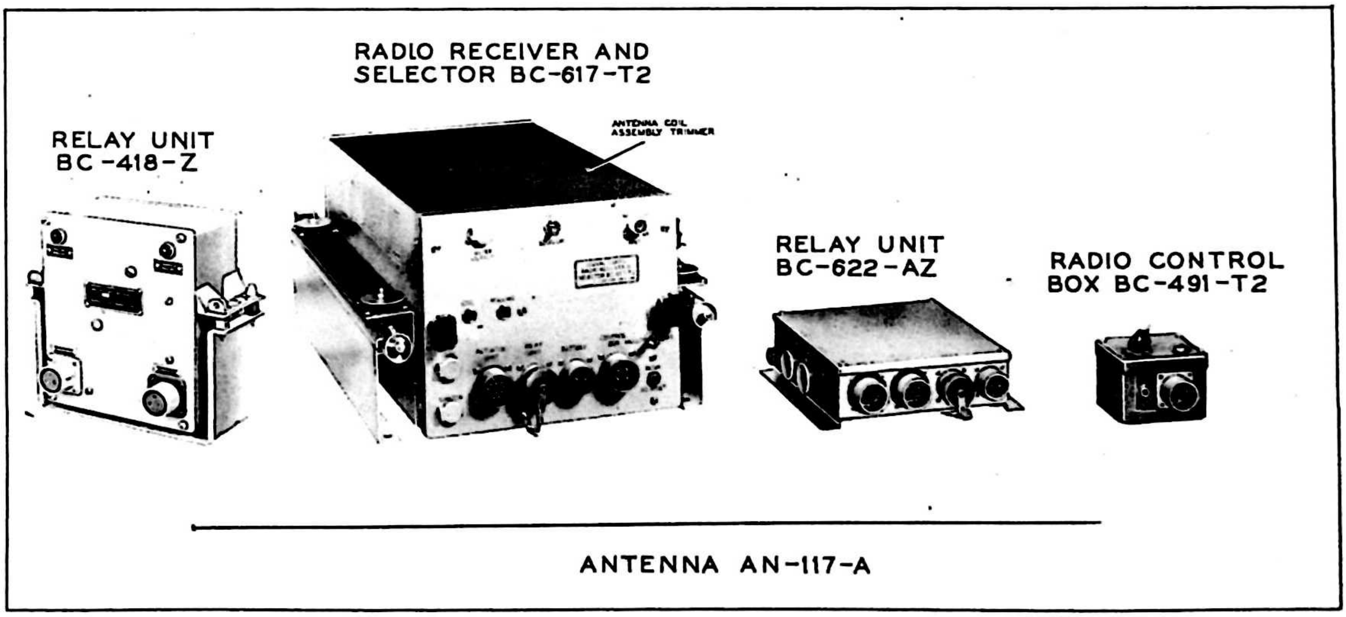

RADIO RECEIVER AND SELECTOR BC-617-T2
RELAY UNIT BC-418-Z
ANTENNA COIL ASSEMBLY TRIMMER
RELAY UNIT BC-622-AZ
RADIO CONTROL BOX BC-491-T2
ANTENNA AN-117-A

Figure 1-1. Target Control Receiving Equipment RC-64-T9—Major Components

2. EQUIPMENT SUPPLIED (Continued)

Quantity per Equipment	*Name of Unit*	*Army Type Designation*	*Overall Dimensions (inches)*	*Weight (pounds)*
1	Radio Control Box	BC-491-T2	4 x 3 x 4	0.0625
1	Antenna	AN-117-A	6 feet	1.0
1	Crystal Unit	CR-1B/AR	1 7/8 x 1 1/8 x 7/16	0.047
1	Mounting, left hand, for Radio Receiver and Selector			1.3
1	Mounting, right hand, for Radio Receiver and Selector			1.3
1	Radio Frequency Cable	RG-11/U	3 1/2	
1	Wire	W-106-A	5 feet	
1	Adapter	M-359	1 1/4 x 1 15/16	0.07
1	Plug	PL-259	1 1/2 x 11/16	0.05
6	Cable Adapter	AN3057-10	1 1/8 x 1 7/16	0.05
10	Cable Adapter	AN3057-12	1 3/16 x 1 9/16	0.06
2	Plug	AN3106-18-3S	2 x 1 5/16	0.12
2	Plug	AN3106-18-5P	2 x 1 5/16	0.10
2	Plug	AN3106-20-1S	2 1/8 x 1 15/32	0.16
2	Plug	AN3108-20-1S	2 1/8 x 1 15/32 x 1 15/16	0.16
2	Plug	AN3106-20-4S	2 1/8 x 1 15/32	0.06
2	Plug	AN3106-20-1S	2 1/2 x 1 15/32	0.16
4	Plug	AN3108-18-5P	2 11/16 x 1 11/32 x 1 15/16	0.11
1	Clip, tube (loop type); set consisting of the following: 1 Part No. AC-755-4 1 Part No. AC-755-6			
1	Insert			
1	Insulator	IN-79		0.10
1	Ferrule			
2	Tag, marked "Servo-Red"			
2	Tag, marked "Servo-Gyro-Green"			
2	Tag, marked "Radio-Blue"			
2	Tag, marked "Aux. Func.-Yellow"			
2	Tag, marked "Battery"			
2	Tag, marked "Control Box"			
2	Tag, marked "Receiver"			
2	Tag, marked "Safety-Red"			
2	Tag, marked "Antenna"			Total Weight 54

3. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

The following table lists the equipment required but not supplied.

Quantity per Equipment	*Name of Unit*	*Army Type Designation*	*Navy Type Designation*	*Required Characteristics*
1	Test set consisting of: 1 Test Unit 1 Test Unit	IE-72 I-201 BC-914		
1	Signal Generator	*GR-804-CS1		
1	Audio Oscillator	*Jackson No. 652 or equal		
1	Oscilloscope	*Dumont 241		

*Designates commercial type designation.

NOTE

For replacement of cords, bulk cord is to be supplied. Plugs and fittings are to be ordered from the table of replaceable parts.

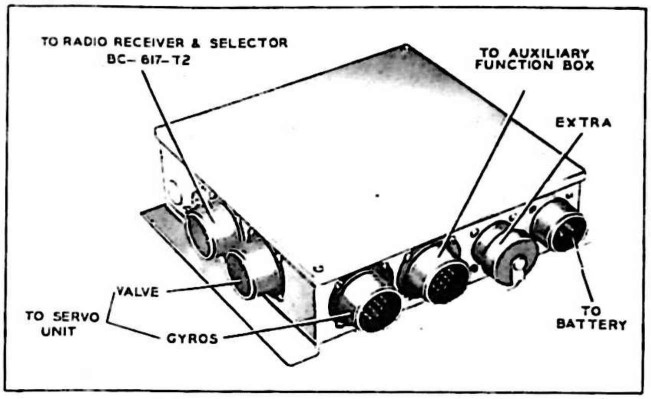

TO RADIO RECEIVER & SELECTOR BC-617-T2
TO AUXILIARY FUNCTION BOX
EXTRA
VALVE
TO SERVO UNIT
GYROS
TO BATTERY

Figure 1-2. Relay Unit BC-622-AZ

4. DESCRIPTION OF MAJOR ASSEMBLIES.

(See figure 1-1.)

a. ANTENNA AN-117-A.—Antenna AN-117-A is a single, tapered rod approximately 6 feet in length, mounted as a shunt-fed quarter-wave antenna.

b. RADIO RECEIVER AND SELECTOR BC-617-T2. *(See figure 2-7.)*—Radio Receiver and Selector BC-617-T2 is rectangular in shape and of typical chassis-case construction. The operating controls and four cable connections are on the front panel. Rubber shock mounts are permanently mounted to the case. Mounting brackets for the right and left side are provided for installation.

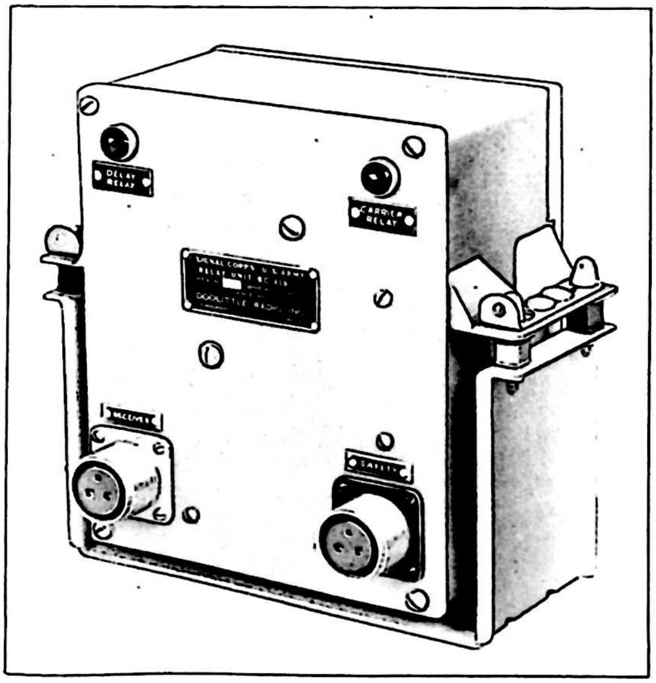


Figure 1-3. Relay Unit BC-418-Z

c. RELAY UNIT BC-622-AZ. *(See figure 1-2.)*—Relay Unit BC-622-AZ is a small, rectangular unit with two cable connections on the front panel and four cable connections on one side. Flanges are attached to the front and back for installation.

d. RADIO CONTROL BOX BC-491-T2. *(See figure 1-4.)*—Radio Control Box BC-491-T2 is a small rectangular box, with a single cable connection on one side, an "ON-OFF" switch, and a "VOLUME" control.

e. RELAY UNIT BC-418-Z. *(See figure 1-3.)*—Relay Unit BC-418-Z is rectangular and has two cable connections on the front panel. Mounting Bracket FT-440 is provided for installation.

5. DESCRIPTION OF TEST SET IE-72.

a. GENERAL.—Test Set IE-72 has two main components: Test Set I-201 and Test Unit BC-914.

b. TEST UNIT I-201.

(See figure 1-5.)

(1) The components of Test Unit I-201 are one carrying case, four meters and three connected cables, and one trimmer screw driver.

(2) The meters in the test unit are: a 0-5 range milliammeter with a push button for 0-1 readings, and a 0-150 range milliammeter connected by one cable, a 0-20 range, a-c voltmeter (1000 ohms per volt) connected to a second cable (audio voltage meter cord) which terminates in a yellow painted plug, and a 0-200 range microammeter connected to the third cable (microammeter cord) which terminates in a green painted plug. A reversing switch is supplied for the microammeter. Only the voltmeter and the microammeter are used to test Target Control Receiving Equipment RC-64-T9.

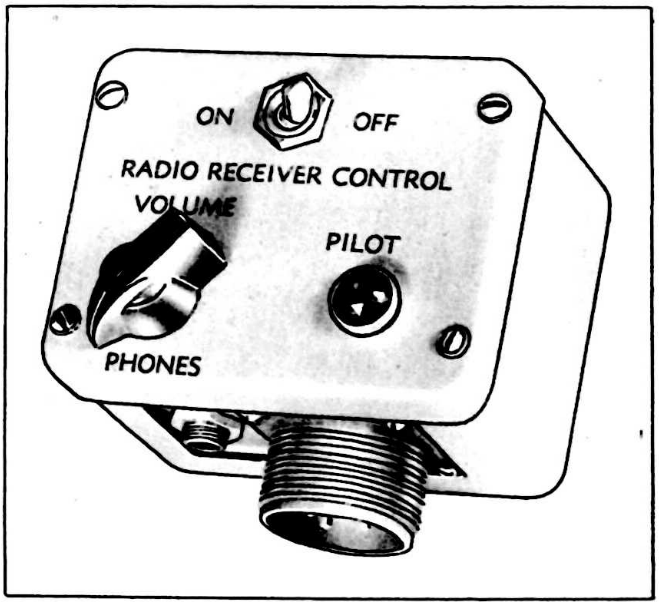


Figure 1-4. Radio Control Box BC-491-T2

c. TEST UNIT BC-914.

(See figure 1-6.)

(1) The components of Test Unit BC-914 are:

Quantity	*Unit*
2	Battery BA-30
1	Cord CD-866A (3 feet)
1	Cord CD-866A (6 feet)
1	Box (5 receptacles, 13 switches and 40 lamps)

(2) The test unit is used for testing the relay circuits of Radio Receiver and Selector BC-617-T2 and Relay Unit BC-622-AZ. The top receptacle and row of lamps are used for the receiver and selector; the three lower receptacles and rows of lamps are used for the relay unit. Two toggle switches connect the test unit for either 12- or 24-volt d-c operation.

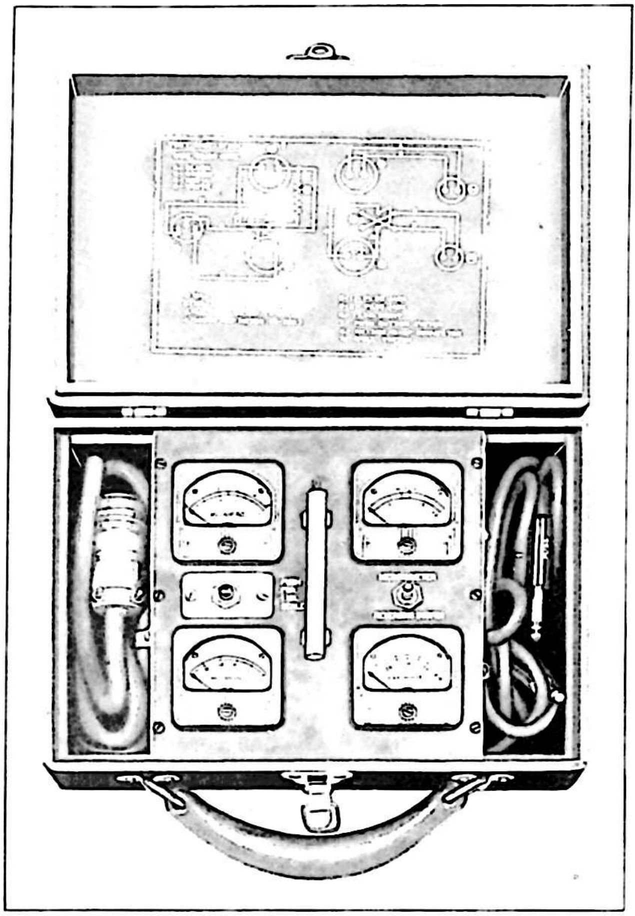


Figure 1-5. Test Unit I-201

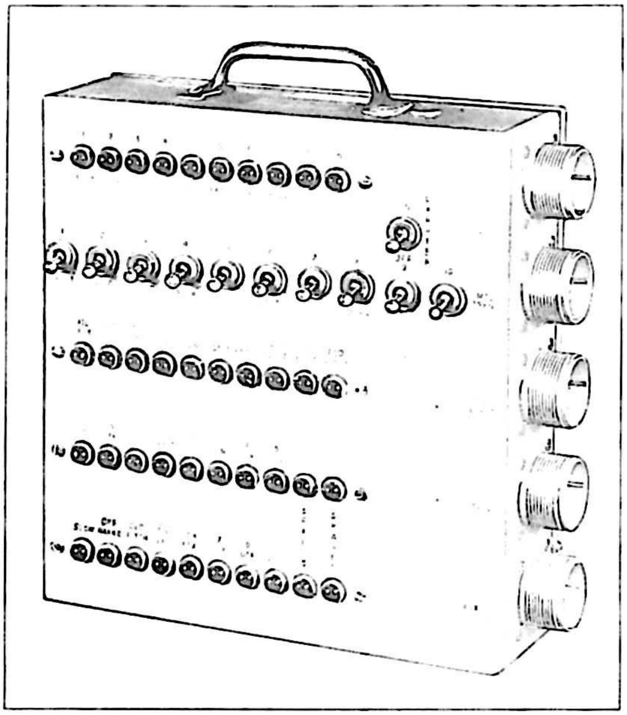


Figure 1-6. Test Unit BC-914

SECTION II
INSTALLATION AND ADJUSTMENT

1. INSTALLATION.

a. RADIO RECEIVER AND SELECTOR BC-617-T2.—Mount Radio Receiver and Selector BC-617-T2 on a horizontal frame so that the case may be removed from the mounts and the chassis from the case as desired. The front panel should be easily accessible. (See fig. 2-4.) Allow sufficient free length of cable so that the shock mounting feature may be as effective as possible. (See fig. 8-8.)

Note

Bulk cord is supplied for fabrication of cables for interconnection of units. Figures 2-1 and 8-3 illustrate the method of wiring power, control box, and actuator cables.

b. ANTENNA AN-117-A.

(See figures 2-2 and 2-3.)

(1) Antenna AN-117-A is on the top of the fuselage between the cockpit and the tail of the plane. The antenna extends through the top of the fuselage into a mounting plate approximately 40½ inches to the rear of the cockpit at an angle of 15° with the vertical.

(2) Insulator IN-79, mounted 30½ inches to the rear of the cockpit, requires a ¾ inch hole in the fuse-

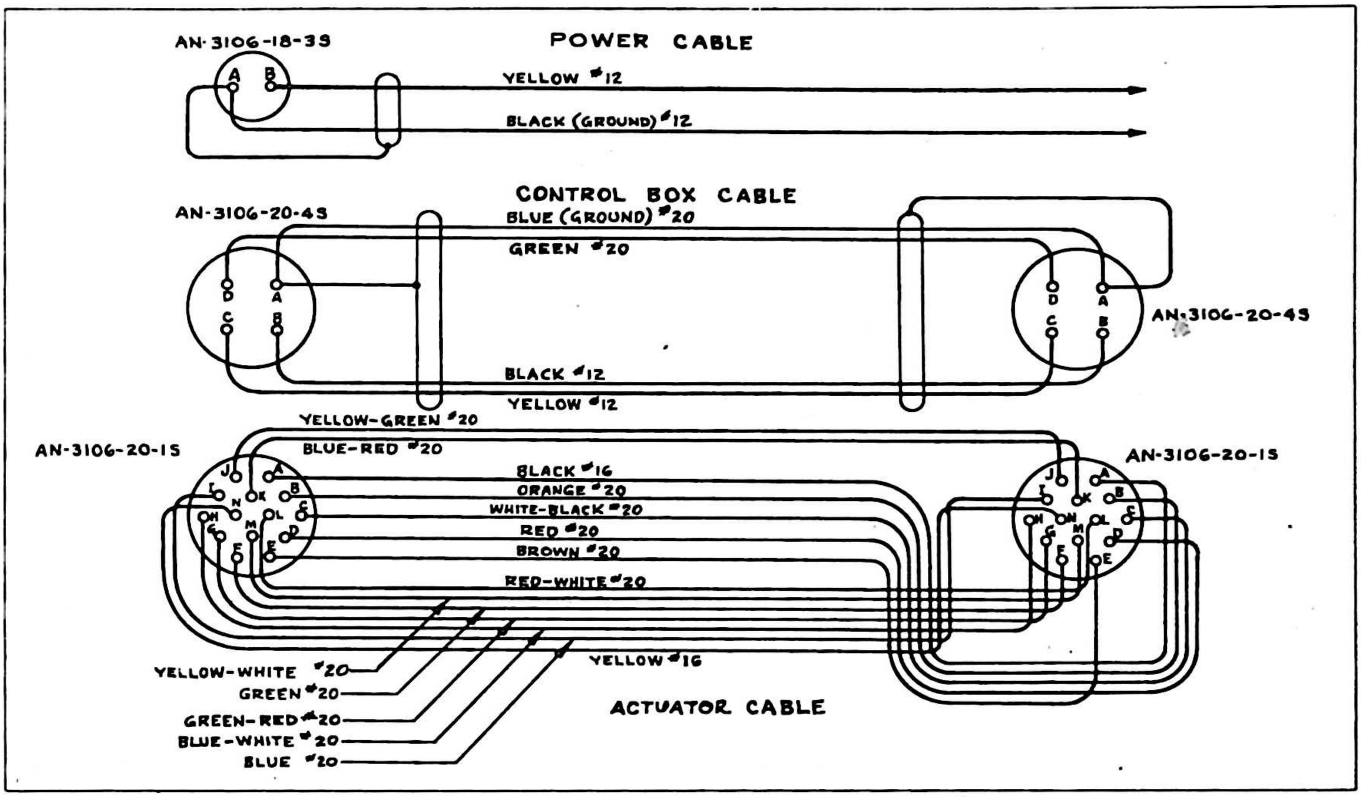

AN-3106-18-3S
POWER CABLE
A
B
YELLOW #12
BLACK (GROUND) #12
CONTROL BOX CABLE
AN-3106-20-4S
BLUE (GROUND) #20
GREEN #20
D
A
C
B
AN-3106-20-4S
BLACK #12
YELLOW #12
YELLOW-GREEN #20
BLUE-RED #20
AN-3106-20-1S
J
A
I
N
K
B
H
L
C
G
M
D
F
E
BLACK #16
ORANGE #20
WHITE-BLACK #20
RED #20
BROWN #20
RED-WHITE #20
AN-3106-20-1S
YELLOW-WHITE #20
GREEN #20
GREEN-RED #20
BLUE-WHITE #20
BLUE #20
YELLOW #16
ACTUATOR CABLE

Figure 2-1. Target Control Receiving Equipment RC-64-T9—Cable Wiring

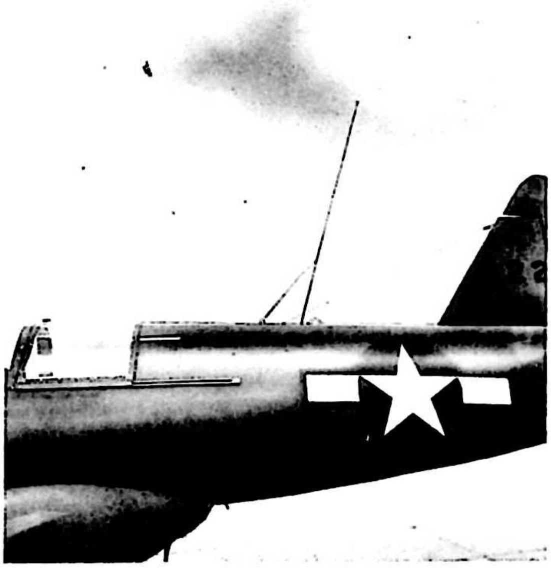


Figure 2-2. Typical Installation of Antenna AN-117-A

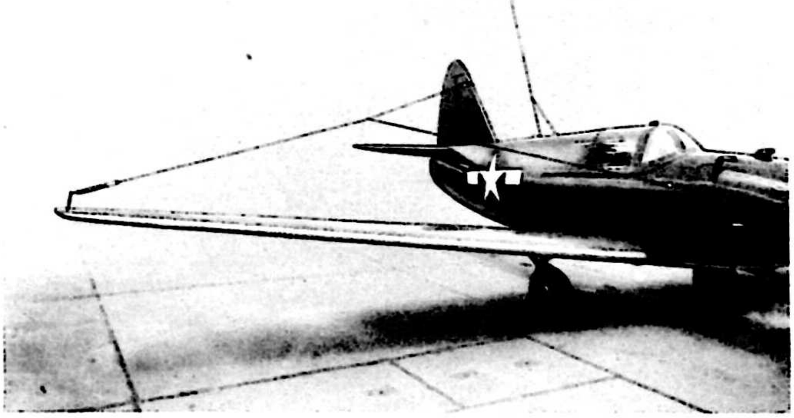


Figure 2-3. Typical Installations of Antenna AN-117-A with Communications Antenna on Target Plane YPQ-14

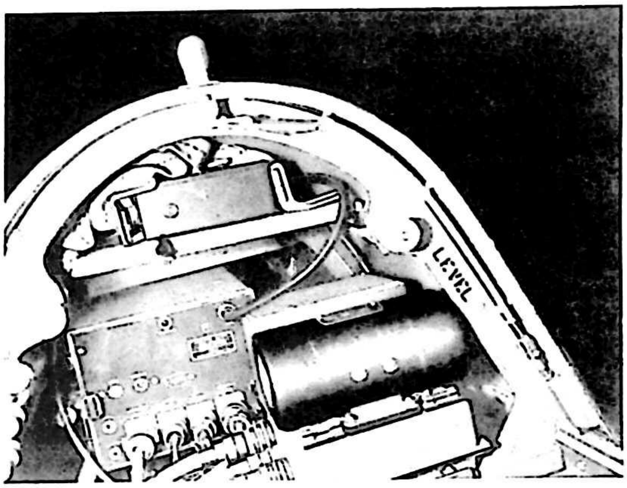


Figure 2-4. Target Control Receiving Equipment RC-64-T9—Installation in Target Plane YPQ-14

lage to allow the feed-through insulator to pass through the fuselage skin into the mounting plate.

(3) Connect the antenna cable to the "ANT" socket on Radio Receiver and Selector BC-617-T2.

(4) Clip the ferruled end of the cord to the antenna bracket near the bottom of Insulator IN-79 making certain the ferrule is grounded to the antenna mounting plate.

(5) Connect the inner conductor of the Antenna Cable to Insulator IN-79.

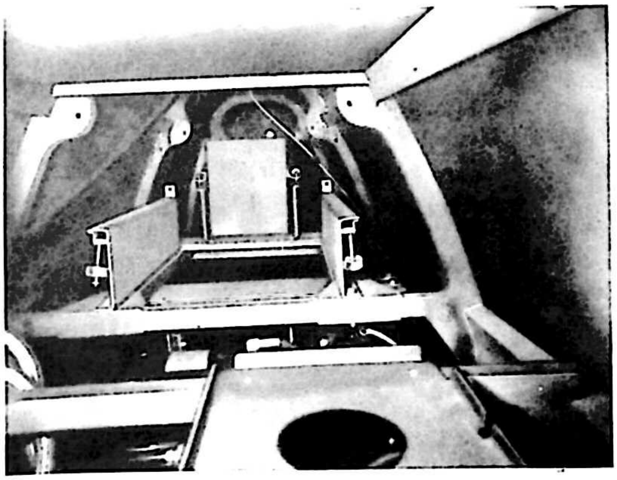


Figure 2-5. Target Control Receiving Equipment RC-64-T9—Installation of Right and Left Hand Mounting Brackets

(6) Anchor the cord to the plane to prevent movement due to the airplane vibrations.

c. RELAY UNIT BC-622-AZ.

(See figures 1-2, 8-4 and 8-10.)

(1) Mount Relay Unit BC-622-AZ in a convenient place so that the "REMOTE-LOCAL" switch and the circuit breaker "SAFE IN-OUT NULLO" switch may be operated when necessary.

(2) Connect the radio cable (blue) from the "RADIO" socket (blue) on the relay unit to the "ACTUATOR UNIT" socket on the radio receiver and selector.

(3) Connect one end of the battery cable to the "BATTERY" socket of the radio receiver and selector and attach the other end to the battery terminal box (not a part of Target Control Receiving Equipment RC-64-T9). The black wire goes to ground, the red wire to the plus terminal.

(4) Connect one end of the servo-gyro cable (green) to the "SERVO-GYRO" socket on the relay unit and one end of the servo cable (red) to the "SERVO" socket. Attach the other ends of both cables to corresponding sockets on the servo unit (not part of Target Control Receiving Equipment RC-64-T9).

d. RADIO CONTROL BOX BC-491-T2.

(See figures 1-4, 8-4, and 8-10.)

(1) Mount Radio Control Box BC-491-T2 in any convenient position.

(2) Connect the control box cable from its socket to the "CONTROL BOX" socket on the radio receiver and selector.

(3) Anchor the cord with a clip to prevent movement.

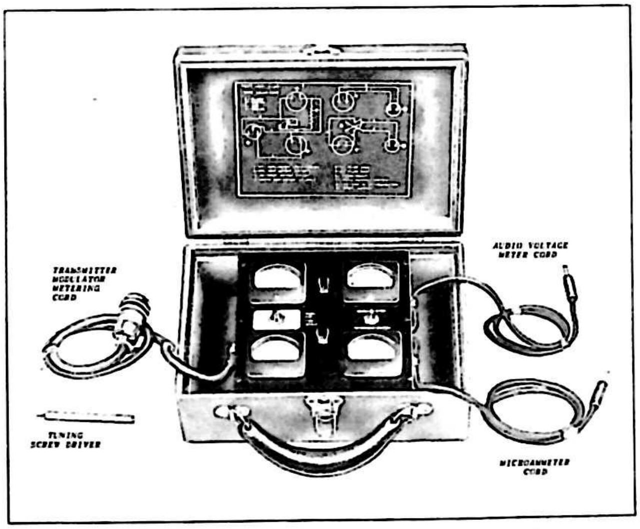


Figure 2-6. Test Unit I-201

e. RELAY UNIT BC-418-Z.

(See figures 1-3, 8-4, and 8-10.)

(1) Install Relay Unit BC-418-Z only when the target airplane is to be flown without a safety pilot.

(2) Mounting Bracket FT-440 is installed behind the receiver-selector in the radio compartment.

(3) Connect receiver cable from the "RECEIVER" socket on this relay unit to the "RELAY UNIT" socket on the radio receiver and selector.

(4) Anchor the cord with a clip to prevent movement due to the vibration of the plane.

(5) Connect the cord (safety red) from the "SAFETY" socket on this relay unit to the "SAFETY" receptacle on the servo junction box.

2. AFTER-INSTALLATION TEST.

(See figure 2-7.)

a. GENERAL. — The equipment should require no initial adjustments other than antenna transformer tuning, unless a distance check, made with a safety pilot in the target airplane, indicates inadequate range. (This test can be made by flying the control airplane at a distance of 3 to 4 miles from the target airplane and checking for proper operation.)

b. PROCEDURE.

(1) Turn the power switch on the radio receiver control box to the "ON" position and allow the set to warm up for one minute.

(2) Plug the audio voltage meter cord (yellow) of Test Unit I-201 into "METER OUTPUT" jack of the receiver.

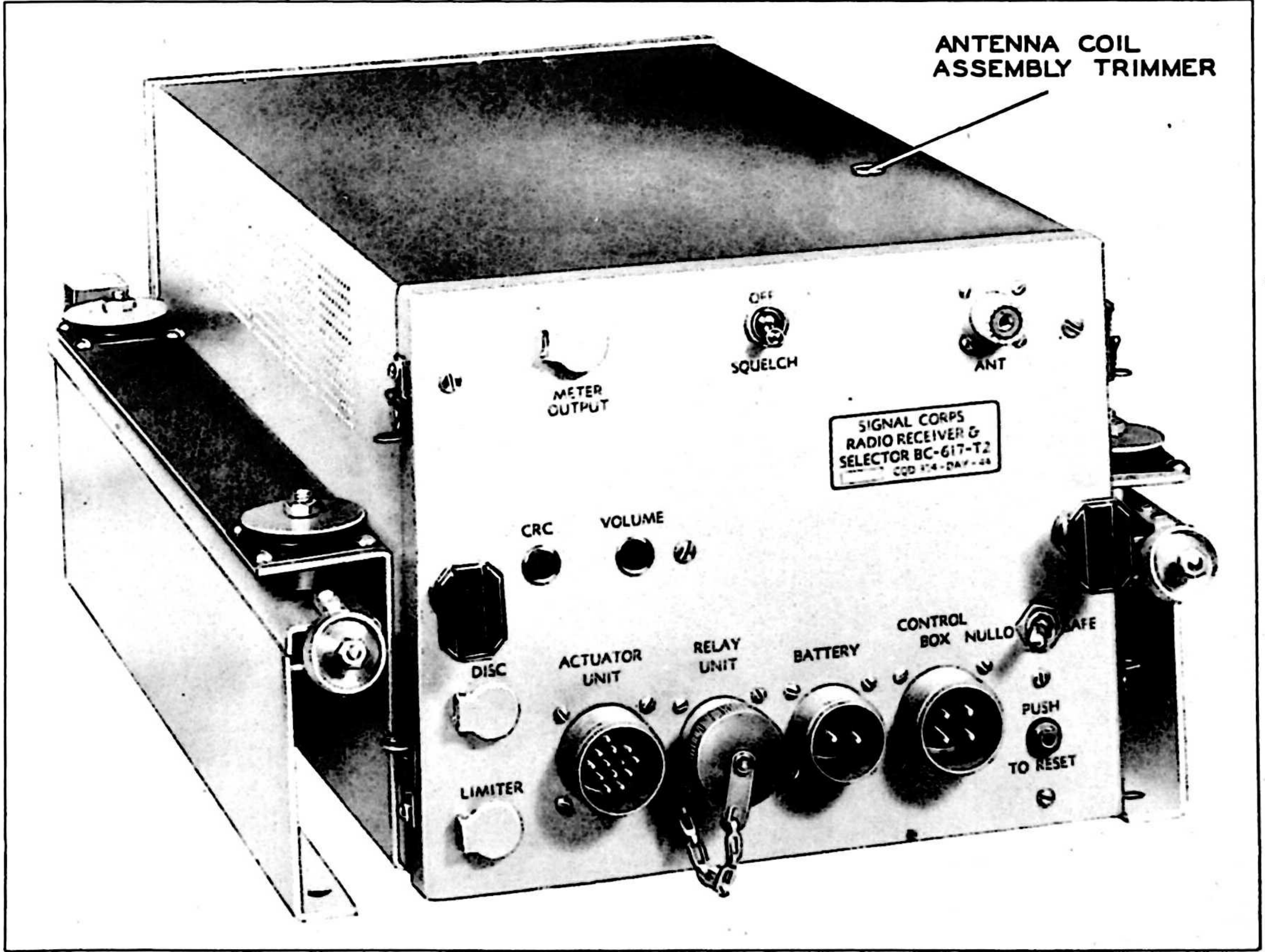

ANTENNA COIL ASSEMBLY TRIMMER
OFF
SQUELCH
ANT
METER OUTPUT
SIGNAL CORPS RADIO RECEIVER & SELECTOR BC-617-T2
CRC
VOLUME
DISC
LIMITER
ACTUATOR UNIT
RELAY UNIT
BATTERY
CONTROL BOX
NULL
SAFE
PUSH TO RESET

Figure 2-7. Radio Receiver and Selector BC-617-T2—Front Diagonal View

(3) Check the noise level with the "SQUELCH" switch in the "OFF" position. If the meter reads more than 1 volt or the meter pointer goes out of the red sector, remove the plug button over the "CRC" control and decrease the sensitivity by turning the screw driver adjustment counterclockwise.

CAUTION

This shall not be done unless absolutely necessary as the resulting condition is abnormal.

(4) Set the "SQUELCH" switch to the "ON" position.

(5) Connect the green plug of Test Unit I-201 to the "LIMITER" jack.

(6) Apply a signal from the transmitter of sufficient amplitude to produce at least a 10-microampere limiter grid current.

(7) Modulate the transmitter with a 2270 cycle-per-second signal by setting the master modulation control (located on the chassis of Radio Modulator and Transmitter BC-925) to the yellow dot.

(8) Remove the plug button from top of the receiver-selector case (see fig. 2-7) and tune the transformer 120 by means of the screw driver adjustment for maximum limiter grid current as indicated on the microammeter. (Make sure the antenna on the receiver and selector is connected.) Replace the plug button.

(9) Remove the plug button over the "VOLUME" control and insert the yellow plug of Test Unit I-201 into "METER OUTPUT" jack. Adjust the audio level so that the audio meter pointer stops near, or slightly above, the right edge of the green sector. Replace the plug button.

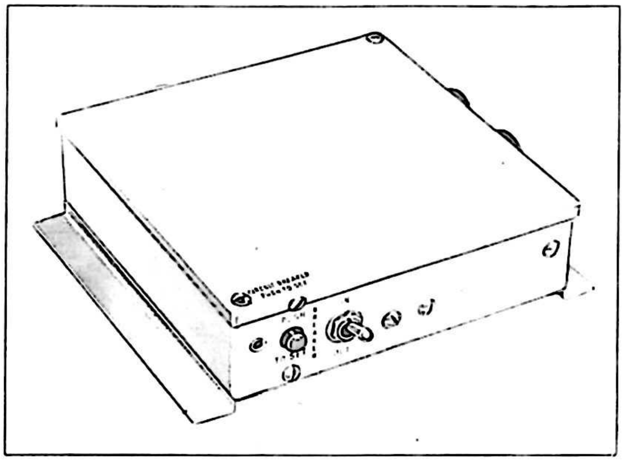


Figure 2-8. Relay Unit BC-622-AZ —Rear Diagonal View

SECTION III

OPERATION

1. GENERAL.

After Target Control Receiving Equipment RC-64-T9 has been prepared for flight and checked, it may be either operated from a remote radio control station or connected directly into Relay Unit BC-622-AZ by means of Control Box BC-756.

2. TO START THE EQUIPMENT.

To start the equipment, throw the "ON-OFF" switch on Radio Control Box BC-491-T2 (see fig. 1-4) to the "ON" position.

3. TO STOP THE EQUIPMENT.

To stop the equipment, throw the "ON-OFF" switch of the radio control box to the "OFF' position.

4. PRE-OPERATION CHECK.

Use Control Box BC-756 of Target Control Transmitting Equipment RC-65 in a nearby control plane or ground control station to test the operation of Target Control Receiving Equipment RC-64-T9 before flight.

a. Turn on the receiver in the plane to be tested and the transmitter in the control plane.

WARNING

Place the "STEP-RESET" lever in the "RESET" position and then release it to the neutral position before any tests are made. Failure to take this precaution may cause serious damage to the plane.

b. With the light under "AUTO" on proceed as follows:

(1) Push the "INCREASE UP-DOWN DECREASE" lever, on Control (stick) Box BC-756 to the "INCREASE UP" position and note if the motor of the plane increases in speed.

(2) Push the lever to the "DOWN DECREASE" position and note if the motor of the plane decreases in speed.

(3) Push the control lever (stick) to the "RIGHT" or "LEFT" positions and note if the rudder of the plane responds with the right and left movements of the control stick.

c. Push the "STEP-RESET" lever to the step position and release it to neutral position where the light under "TURN" will glow. The "RIGHT" position of the stick will give aileron right; the "LEFT" position of the stick will give aileron left. All other conditions will remain the same.

Note

> With the preceding steps completed, with the lights "AUTO" and "TURN" on, all flight functions are available, including motor throttle operation and should be sufficient for a normal operational test of the equipment. For a more extensive check add the following tests:

d. Push "STEP-RESET" lever to the "STEP" position, release it to neutral, and the light under "BRAKE" will flash on. With the "BRAKE" light on, the "INCREASE UP-DOWN DECREASE" lever will control the wheel brakes while the control lever (stick) will give down and up elevator and right and left rudder.

e. Push the "STEP-RESET" lever to "STEP" and release to neutral; at the same time push in the safety button to the left of the control lever (stick). The light under "PITCH" indicates that the "INCREASE UP-DOWN DECREASE" lever will controll the propeller pitch. The stick controls the rudder and the elevator.

f. Push the "STEP-RESET" lever to "STEP" and release it to neutral; at the same time push in the safety button to the left of the control lever (stick). The light under "FLAPS" indicates that the "INCREASE UP-DOWN DECREASE" lever will control the propeller stick controls the rudder and the elevator.

CAUTION

> Do not use the step marked "GEAR" while the plane is on the ground; the landing gear may be retracted and serious damage may result.

g. For operational procedure of a typical flight refer to section VI, paragraph 5.

SECTION IV

THEORY OF OPERATION

1. GENERAL.

a. The remote transmitter transmits a frequency-modulated r-f signal which is picked up by the antenna of the target plane. Modulation occurs at one of several tone frequencies.

b. This signal is applied to Radio Receiver and Selector BC-617-T2. (See fig. 4-1.)

(1) In the superheterodyne-receiver section of the unit, the r-f signal is amplified and changed to intermediate frequency, where further amplification of the signal occurs, extraneous noise impulses removed, and the signal changed to audio frequency.

(2) In the eight-channel selector section the audio signal is amplified and fed to eight audio band-pass filters. Voltages of the proper frequency are passed to operate the proper relays in the selector section.

c. These relays, in turn, operate other relays in and through Relay Unit BC-622-AZ which route the control signal to operate the various functions.

2. FUNCTIONING OF PARTS.

a. RADIO CONTROL BOX BC-491-T2.

(See figure 1-4.)

(1) The power switch on the radio control box controls the power-supply circuit from the battery source to the radio receiver and selector. The pilot light, the filament, and the plate supplies are turned on simultaneously. (See fig. 7-5.)

(2) The headphone jack accommodates a 2,000-ohm-impedance headset for monitoring the audio input to the radio receiver and selector, or for checking purposes when there are indications of malfunctioning.

(3) The volume control adjusts the level of the audio voltage.

b. ANTENNA AN-117-A.—Antenna AN-117-A receives the transmitted signal and feeds it through the antenna cable to the "ANT" plug of the radio receiver and selector.

c. RADIO RECEIVER AND SELECTOR BC-617-T2. *(See figure 8-12.)*

(1) SUPERHETERODYNE-RECEIVER SECTION.

(a) The signal received from the antenna is fed through the antenna transformer 120 to the control grid of the r-f amplifier tube. The amplified signal is then fed to the grid of the converter.

(b) The oscillator tube generates the correct heterodyning frequency by amplifying the fourth harmonic of the crystal oscillator (103) (XTAL). This frequency is 3 megacycles lower than that of the signal from the r-f amplifier tube.

(c) Both signals are combined in the converter tube to produce an intermediate frequency of 3 megacycles.

(d) The sensitivity of the receiver is controlled by the carrier relay control 112 "CRC," which changes the bias of the converter tube. The "CRC" control, by adjusting the sensitivity of the receiver, determines the point at which the carrier relay 131 will be activated by an r-f signal from the transmitter.

(e) The output of the converter is fed through the i-f transformer 123-1 which passes it on to the control grid of the first i-f amplifier tube.

(f) Further amplification and selectivity is obtained in the second intermediate amplifier through transformers 123-2 and 123-3.

(g) The third i-f transformer (123-3) feeds into the grid of the limiter tube, which acts to reduce any amplitude modulation due to static or noise impulses. The voltage developed by the limiter grid current flowing through resistor 140-2 is used for automatic volume control for the i-f and r-f stages.

(h) The signal from the discriminator transformer 124 is fed to the cathodes of the discriminator twin diode where the frequency variations of the incoming signal are changed to audio frequency by means of a conventional discriminator network.

(2) EIGHT-CHANNEL SELECTOR SECTION. *(See figures 2-7 and 8-12.)*

(a) The discriminator output, appearing across resistor 140-14, operates carrier relay 131 through the first audio-amplifier tube. (This relay grounds the audio voltage delivered to the second audio amplifier if the "SQUELCH" switch (102) is "ON" and the carrier falls below the predetermined value of the carrier relay control. This function of the relay can be eliminated by throwing the "SQUELCH" switch to the "OFF" position. Another function of this relay is to supply voltage to Relay Unit BC-418-Z when the relay is energized).

(b) The audio signal from the discriminator tube is also fed to the grids of the first audio-amplifier tube. An RC network consisting of resistors 151 and 152 and capacitors 164 and 162-5, changes the audio fidelity to offset the pre-emphasis introduced in the transmitter.

(c) The output of the second section of the first audio-amplifier tube, as determined by the position of the volume control, is fed to the grids of the second audio amplifier.

(d) The output from the first or monitor section of the second audio tube is fed through the control box cable to the headphone jack of Radio Control Box BC-491-T2.

(e) The output from the second or selector section of the second audio tube, the relative value of which can be determined by the audio-frequency meter of Test Unit I-201, is reduced by a voltage-dividing network and fed to the grids of the eight selector channels.

(f) Each of the eight selector channels consists of a tube 12SN7GT, a filter network, a 500,000-ohm potentiometer, and an operating relay. (See figs. 8-11 and 8-12.) Each of the eight relays acts as a switch to pass a voltage into the Relay Unit BC-622-AZ to activate a function of plane operation. Each relay is energized at a particular frequency and at a definite potential due to the selective action of the pre-tuned filter networks in filter blocks 116 and 117. Each filter block consists of four sections; each section is tuned for a particular frequency. A potentiometer in each grid circuit adjusts the

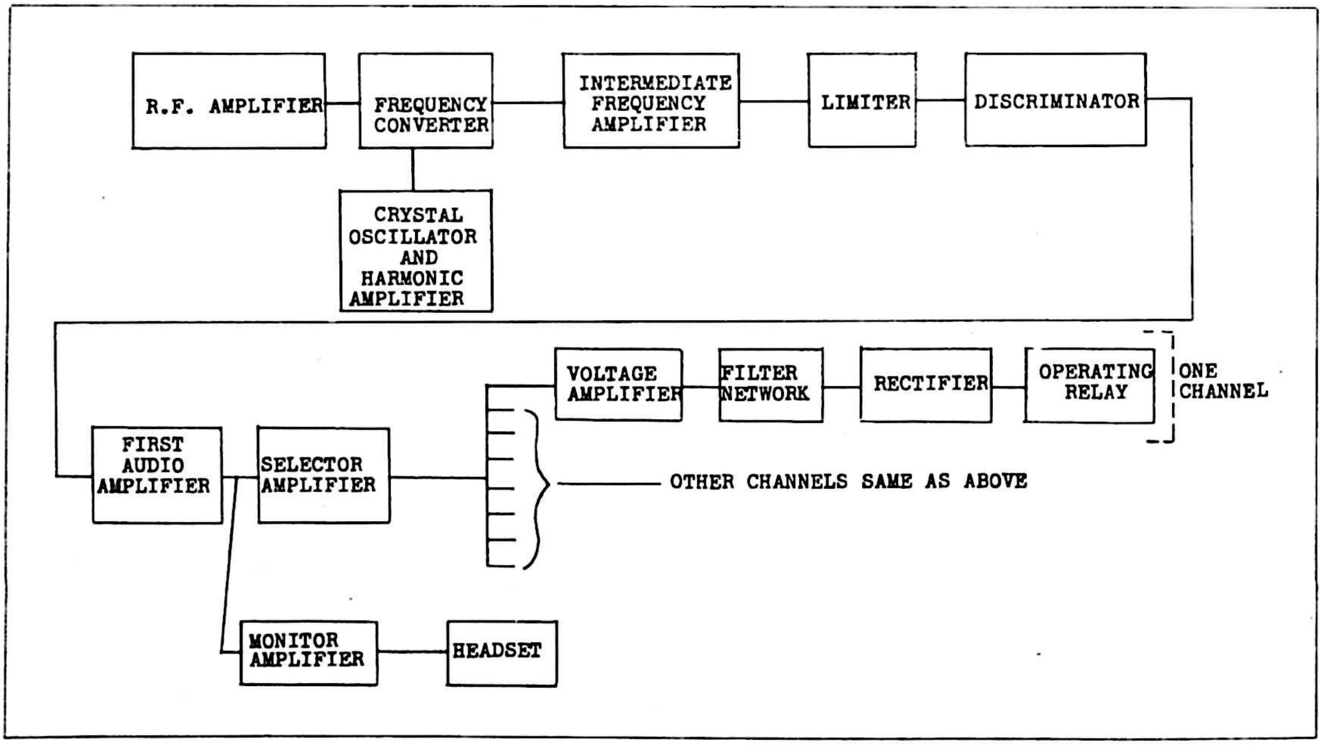


Figure 4-1. Radio Receiver and Selector BC-617-T2—Block Diagram

amplitude of the signal applied. The tube 12SN7GT has two sections: the first section amplifies the input from the second audio amplifier (V-9); the second section operates the relay.

(g) The audio signal, comprising all the tones transmitted, is fed from the second audio amplifier tube (V-9) to the grids of the amplifier sections of all tubes 12SN7GT of the selector section. The function of the potentiometer in each of the eight circuits is to adjust the input to each individual tube by setting the pull-in point of each relay. It is necessitated by the internal differences found in each tube and associated circuit. The amplified signal appearing in the plate circuit is applied to the filter blocks 116 and 117 where the pre-tuned sections select the proper frequency. The selected tone is then applied to the second grid of that tube, which is a part of the circuit for that particular frequency, and is used for activation of the relay in that circuit. The relay control section of each tube is biased nearly to cut-off so that plate current flows during the positive swing of the input signal but not during the negative swing. This makes a pulsating direct current flow in the relay windings. The filtering of the pulsating d-c current by a condenser across the relay coil to ground results in a steady flow of current for relay operation.

d. RELAY UNIT BC-622-AZ. *(See figures 4-2 and 7-6.)*—Relay Unit BC-622-AZ consists of a three-deck selector switch, a relay switch (transfer relay), two additional relays for operation of the selector switch (step and reset coils), and a toggle switch for local and remote control of Radio Receiver and Selector BC-617-T2.

(1) The selector switch is operated by the switch action of relays *1* and *2* of Radio Receiver and Selector BC-617-T2 which allows a voltage to pass from the receiver through pins B and C of socket 1-1 (see fig. 7-6) to the reset and step coils respectively when signals of 300 and 420 cycles per second are applied to the selector section of the receiver. Each voltage impulse through pin C from relay *2* of the receiver moves the selector switch arm up one position. One voltage impulse through pin B from relay *1* of the receiver selector section returns the switch arm to the starting position. The "STEP-RESET" switch of Control Box BC-756 (not a part of Radio Receiver and Selector BC-617-T2) controls channels 1 and 2 of the modulator section of Target Control Transmitting Equipment RC-65. The signal transmitted is modulated at the proper frequency (300 and 420 cycles per second). This in turn controls relays *1* and *2* respectively of the selector section of Radio Receiver and Selector BC-617-T2.

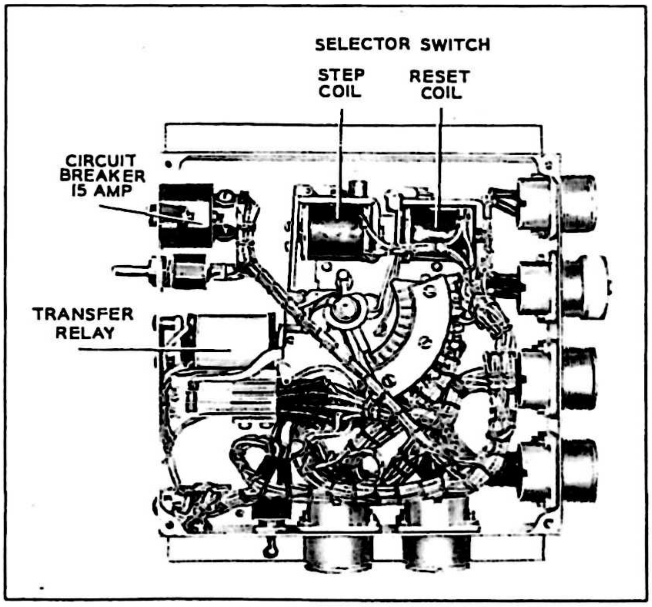


Figure 4-2. Relay Unit BC-622-AZ—Interior View

(2) Relays *3* and *4* of Radio Receiver and Selector BC-617-T2 are activated by movement of the "INCREASE UP-DOWN DECREASE" lever of Control Box BC-756 which controls channels 3 and 4 of the modulator section of the transmitter. The action of relays *3* and *4* of the selector section of Radio Receiver and Selector BC-617-T2 allows a voltage to pass through pins D and E to the switch arms of the first two decks of the selector switch of Relay Unit BC-622-AZ. Relay number *3* of the receiver selector section, through the switch arm of the first deck, controls the throttle fast, brake on, increase pitch, up flaps, up landing gear, extra increase, on (extra), and mixture rich, each function depending upon the position of the switch arm. Relay number *4*, through the switch arm of the second deck, controls the reverse action of the above mentioned functions.

Note

> The position of the indicator lights on Control Box BC-756 should not be confused with selector switch positions of Relay Unit BC-622-AZ. The first column of the table below indicates the position of the selector switch in the relay unit while the second column indicates the corresponding lights activated on the front panel of Control Box BC-756.

TABLE 4-1. BASIC FUNCTIONAL INDICATIONS OF RELAY UNIT BC-622-AZ

Selector Switch Position in Relay Unit BC-622-AZ	*Indicator Light on Control Box BC-756*	
	Light Number	*Function*
0	1	(AUTO)
1	2	(TURN)
2	3	(BRAKE)
3	4	(PITCH)
4	5	(FLAPS)
5	6	(GEAR)
6	7	(EXTRA)
7	8	(EXTRA)
8	9	(EXTRA)
9	10	(EXTRA)

(3) Relays 5 and 6 of the receiver selector sections are activated by the right and left movement of the control stick of Control Box BC-756 which applies signals of 1155 and 1620 cycles per second to channels 5 and 6 of the modulator section of the transmitter which then transmits a modulated tone at the above frequencies to the channel selector section of the activating relays 5 and 6 of Radio Receiver and Selector BC-617-T2. The switch action of the relays allows a voltage impulse to pass through the relay-activated switch 4 of Relay Unit BC-622-AZ (see fig. 8-6) and into the servo unit. Relay 5, through pin F of the relay unit, operates the right rudder, while relay 6 operates the left rudder through pin G. Both right and left rudder are operative through all positions of the selector switch with the exception of position 1 ("TURN" on the control box). A connection from the third deck of the selector switch (position 1) activates relay switch 4 of Relay Unit BC-622-AZ and throws the control from rudder to aileron. This same relay action also cages or uncages the gyro motor. When the selector switch is in position 1 the gyro motor is caged and the rudder is centered. On all other positions of the selector switch the gyro motor is uncaged and the rudder is free while the ailerons are centered.

Note

The first five positions of the selector switch are all that are used in Target Control Receiving Equipment RC-64-T9. The remaining positions may be utilized for other functions if they are desired.

(4) Relays 7 and 8 are activated by the up-and-down movement of the control stick of Control Box BC-756. Signals of 2270 and 3180 cycles per second are applied to the modulator channel section of the transmitter and are then transmitted to the receiver where those particular frequencies activate relays 7 and 8. The switch effect of the relays thus permits a voltage to pass through pins H and I to the servo unit to operate the up-and-down movement of the elevator.

(5) The "LOCAL-REMOTE" switch permits operation of the relay unit either from a remote transmitter or in a local position with Control Box BC-756 connected directly to the relay unit in place of Radio Receiver and Selector BC-617-T2.

c. RELAY UNIT BC-418-Z.

(1) Relay Unit BC-418-Z is controlled by a carrier-control relay in Radio Receiver and Selector BC-617-T2. It consists of a timing head, a coil and magnet circuit, and a contact switch. (See fig. 5-3.)

(2) As long as sufficient carrier-frequency energy is present and the carrier-control relay is closed, the control circuit of Relay Unit BC-418-Z is energized and the core of the magnet in the timing relay is held against the spring.

(3) The instant the carrier frequency falls below a set amount the coil becomes de-energized.

(a) The spring compression is then transmitted through the spindle to the compression diaphragm of the timing head.

(b) This diaphragm slowly forces the air through the bleeding valve of the timing head at a predetermined rate of flow.

(c) When the spindle reaches a certain point a release is sprung, allowing a quick release of the remaining air.

(d) This action causes a quick, final movement of the spindle which in turn causes the switch to operate the unit placing the target in a slow climb and right turn.

SECTION V
MAINTENANCE

1. PRE-FLIGHT INSPECTION.

a. WITH "SAFE-NULLO" SWITCH AT THE "SAFE" POSITION.

(1) Check all cable connectors to see that their locking rings are secure.

(2) Check the snapslides securing the chassis of Radio Receiver and Selector BC-617-T2.

(3) Check to be certain that the thumb screws holding the case to the brackets are firmly screwed down.

(4) Check switches on Relay Unit BC-622-AZ. "REMOTE-LOCAL" switch should be in the "REMOTE" position and the circuit breaker switch in the "SAFE" position.

(5) Turn the "SAFE-NULLO" switch on Radio Receiver and Selector BC-617-T2 to the "SAFE" position.

(6) Follow instructions given in section II, paragraph 2.

(7) Check Radio Receiver and Selector BC-617-T2 with Test Unit I-201 as follows:

(a) Plug the green plug of Test Unit I-201 into the "LIMITER" jack of the receiver (see fig. 2-7).

(b) Remove the plug on top of the receiver case and, with an insulated screw driver, adjust the antenna trimmer for a maximum current reading as indicated by the microammeter.

(c) Plug the yellow plug (audio voltage meter cord) of Test Unit I-201 into the "METER-OUTPUT" jack on the panel of the receiver.

(d) With the control truck or control airplane at least 300 feet away and with #7 audio channel (up) operating, set the "VOLUME" control on Radio Receiver and Selector BC-617-T2 so that the meter needle rests at the top of the green section.

(e) Check all remaining tones to see if the meter indication is approximately the same as above for all channels.

Note

The meter should not fall below the bottom of the green section or rise a like distance into the second yellow section of the audio meter for all remaining frequencies.

(8) Check over all operations of the equipment in conjunction with associated units.

b. "SAFE-NULLO" SWITCH AT THE "NULLO" POSITION.

(1) Follow steps 1-7 outlined above. Step (4) should read: "The 'REMOTE-LOCAL' switch should be in the 'REMOTE' position and the circuit breaker switch should be in the 'OUT-NULLO' position."

(2) The "SAFE-NULLO" switch on Receiver and Selector BC-617-T2 should be in the "NULLO" position.

(3) Operate Relay Unit BC-418-Z ten or fifteen times prior to actual use, checking for a time delay of approximately 5 seconds.

2. TEN-HOUR INSPECTION.

a. Every two weeks (or every ten hours of flight, whichever comes first) pull the chassis of Radio Receiver and Selector BC-617-T2 from its case and remove dust and dirt.

b. Inspect relay contacts; if necessary, clean all points by carefully drawing a clean piece of paper between the points when they are closed manually. Normal inspection procedure will reveal any necessity for more frequent cleaning.

c. Check the sensitivity of Radio Receiver and Selector BC-617-T2 by a range check of from 6 to 7 miles as follows:

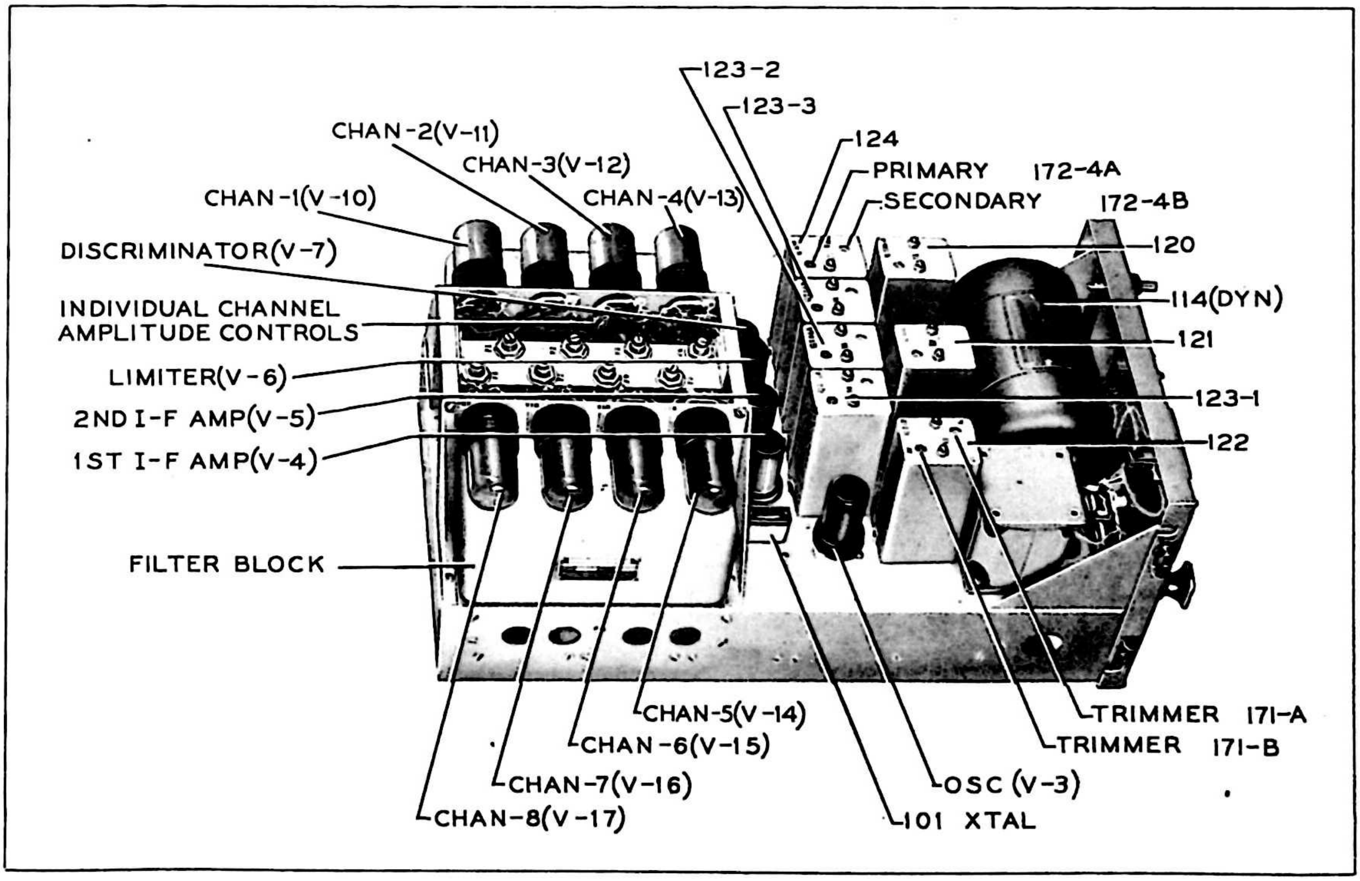

123-2
123-3
124
PRIMARY 172-4A
SECONDARY 172-4B
CHAN-2(V-11)
CHAN-3(V-12)
CHAN-1(V-10)
CHAN-4(V-13)
120
DISCRIMINATOR(V-7)
114(DYN)
INDIVIDUAL CHANNEL AMPLITUDE CONTROLS
121
LIMITER(V-6)
123-1
2ND I-F AMP(V-5)
122
1ST I-F AMP(V-4)
FILTER BLOCK
CHAN-5(V-14)
TRIMMER 171-A
CHAN-6(V-15)
TRIMMER 171-B
CHAN-7(V-16)
OSC (V-3)
CHAN-8(V-17)
101 XTAL

Figure 5-1. Radio Receiver and Selector BC-617-T2—Top Interior View

Note

> It is recommended that the receiver be tested while the plane is in flight with a safety pilot, the plane controlled from a remote point to enable the safety pilot to make the necessary adjustments.

(1) Plug the yellow plug of Test Unit I-201 into the "METER OUTPUT" jack of the receiver.

(2) Check the audio meter of Test Unit I-201 and notice meter deflections. On noise peaks the meter pointer should not move more than one quarter of the total distance into the first red section unless a control tone is applied.

Note

> If a control tone is being applied from a remote point (control station) wait until the tone has been removed and proceed with the check.

(3) If the meter deflection is less than a quarter of the distance of the first red section the noise level is low. The receiver sensitivity can safely be increased allowing a greater operating range. To increase the sensitivity remove the cover from the "CRC" control on the panel of the receiver and turn the control in a clockwise direction with a screw driver, increasing the sensitivity to a point, as indicated on the meter, where received noise peaks do not exceed a quarter of the length of the first red section of the audio meter.

Note

> This adjustment should not be made unless absolutely necessary. For more detailed information consult "SECTION VI—SUPPLEMENTARY DATA" under paragraph 4.

(4) If the range is still inadequate and the antenna trimmer on r-f transformer 120 has been peaked, send the receiver to a repair depot for a complete check.

3. TROUBLE SHOOTING.

Note

> Only personnel experienced in radio maintenance work should attempt service work on this equipment. In no case should the value of a component be changed from the value indicated in the material list.

a. If dynamotor fails to start check the fuse or the circuit breaker.

b. Check all tubes, preferably by substituting other tubes that are definitely known to be good.

c. Measure plate and filament voltages (see paragraph 11 of this section). If plate voltage on one of the r-f converters or i-f stages is excessively low, check for shorted-plate, bypass (de-coupling) condensers. These condensers are shown in schematic diagram figure 7-12 as 160-3 in plate circuit of the r-f amplifier, 160-16 in the plate circuit of the converter stage, 160-8 in the plate circuit of the first i-f stage, 160-11 in the plate circuit of the second i-f stage, and 160-13 in the plate circuit of the limiter.

d. If all voltages are low check the dynamotor filter condensers (168) for breakdown; if the voltages are still low check the dynamotor by substituting another which is known to be in good condition.

e. Turn on Target Control Transmitting Equipment RC-65.

f. If no signal is received at this point, check the oscillator stage as follows (see figure 8-12 and 5-1):

(1) Connect a volt-ohmmeter from the screen grid (lug 4) of the oscillator tube (socket 109-9) to ground and tune the trimmer on transformer 122 marked 171-A, for maximum voltage.

(2) Connect the green plug of Test Unit I-201 to the "LIMITER" jack on the panel of the receiver. Tune trimmer 171-B on transformer 122 for maximum limiter-grid current.

(3) Change the green plug on the test unit to the "DISC" jack and adjust the secondary trimmer (172-4B) on transformer 124 to a point where the microammeter swings sharply through zero. Set slightly above the zero point.

(4) Adjust the primary trimmer (172-4B) for maximum deflection on the microammeter of the test unit.

(5) Readjust the secondary trimmer for approximate zero indication.

g. Apply an audio signal of 2270 cycles (tone #7) from the transmitter and connect the yellow plug of Test Unit I-201 in the "METER-OUTPUT" jack or the panel of Radio Receiver and Selector BC-617-T2. If no deflection (top of green section) is obtained on the meter, check the volume control circuit for opens or shorts and check the associated coupling condenser (166) for breakdown. No deflection on the meter may also be caused by a faulty audio amplifier tube (V-8 or V-9).

4. CHECK OF CHANNEL SELECTOR SECTION.

a. SELECTION OF TUBES FOR SELECTOR SECTION. *(See figure 8-12.)*—If one of the eight selector tubes (JAN-12N7GT) has been checked on a tube tester as satisfactory, it does not indicate that the tube will operate in one of the individual selector units. All vacuum tubes of the same type will vary in their characteristics from tube to tube. As a result different tubes operated at the same values of plate potential and grid bias will pass differing amounts of plate current. Since the relay control tubes in this equipment are all biased alike, some tubes will allow more current to flow through the associated relay coils when no signal is applied than will others. For proper operation the voltage drop across the relay coil due to this residual current must be less than 15 volts. If the relay-coil current is too high the relays will be partially energized at all times with no input signal applied. When one tube is replaced by another

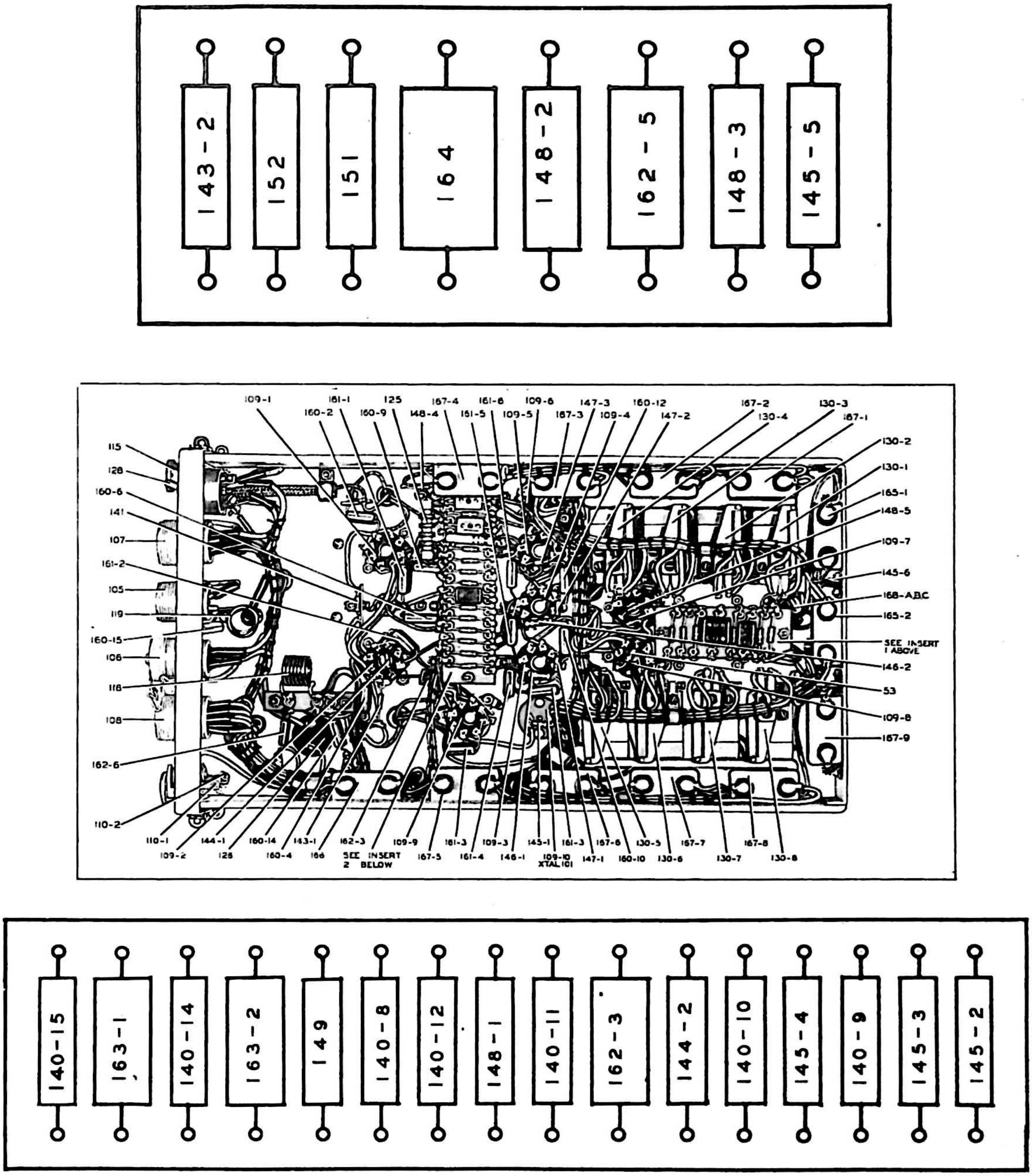

143-2
152
151
164
148-2
162-5
148-3
145-5
109-1
161-1
160-2
125
160-9
148-4
167-4
161-6
161-5
109-6
109-5
167-3
147-3
109-4
160-12
147-2
167-2
130-4
130-3
167-1
130-2
130-1
165-1
148-5
109-7
145-6
168-A,B,C
165-2
SEE INSERT 1 ABOVE
146-2
53
109-8
167-9
115
128
160-6
141
107
161-2
105
119
160-15
106
118
108
162-6
110-2
110-1
109-2
144-1
126
160-14
160-4
143-1
166
162-3
SEE INSERT 2 BELOW
109-9
167-5
161-3
161-4
109-3
146-1
145-1
109-10 XTAL 101
161-3
147-1
167-6
160-10
130-5
130-6
167-7
130-7
167-8
130-8
140-15
163-1
140-14
163-2
149
140-8
140-12
148-1
140-11
162-3
144-2
140-10
145-4
140-9
145-3
145-2

Figure 5-2. Radio Receiver and Selector BC-617-T2—Bottom Interior View

and its residual current is satisfactory (less than 15 volts) the circuit of which it is a part must be adjusted for proper sensitivity for that particular tube.

Note

Use a voltmeter with a sensitivity of not less than 1000 ohms per volt to check the voltage drop across the respective selector relay coil. When this measurement is being made no signal should be applied to the antenna connection or the "DISC" jack of Radio Receiver and Selector BC-617-T2.

b. ADJUSTMENT FOR PROPER SELECTOR SENSITIVITY.

(1) Connect an audio oscillator to the "DISC" jack of Radio Receiver and Selector BC-617-T2.

(2) Remove the cap from the "VOLUME" control on the receiver panel and turn adjustment to full clockwise position.

(3) Connect the yellow plug of Test Unit I-201 to the "METER-OUTPUT" on the receiver panel.

(4) Turn on the audio oscillator, set the dial to the frequency of the circuit of which the tube is a part, and adjust the gain until the audio meter of Test Unit I-201 reads full scale.

(5) Adjust the "VOLUME" control of the receiver until the meter of the test unit returns to the top of the first red section.

(6) Connect the "REC-SEL" socket of the Test Unit BC-914 to the "ACTUATOR-UNIT" socket of the receiver.

(7) Slowly adjust the potentiometer (111-1 to 111-8, selecting the one associated with the replaced tube) until the light of Test Unit BC-914 which corresponds to that particular circuit of the receiver lights. For instance, if the tube changed is a part of channel number one the sensitivity control is potentiometer 111-1. Slow adjustment of the sensitivity control will cause the light marked 1 (RESET) on Test Unit BC-914 to light.

Note

This adjustment should be made as accurately as possible. With the potentiometer turned to approximately full counterclockwise position, turn it as slowly as possible in a clockwise direction until the light in the test unit flashes on. Do not turn past this point.

(8) Before the receiver is ready for operation it is necessary to re-adjust the "VOLUME" control with transmitter modulation applied. To accomplish this apply a signal of 2270 cycles, #7 (UP), from the transmitter and adjust the "VOLUME" control so the meter pointer of Test Unit I-201 rests at the top of the first red section.

Note

After all adjustments have been made with the audio oscillator disconnect it, and apply a 2270-cycle tone (UP) from the transmitter. Readjust the "VOLUME" control until the meter pointer of Test Unit I-201 rests at the top of the first red section.

TABLE 5-1. AUDIO OSCILLATOR SETTING IN CYCLES

Reference Number	*Selector Channel Number*	*Audio Oscillator Setting in Cycles*
111-1	1	300
111-2	2	420
111-3	3	590
111-4	4	825
111-5	5	1150
111-6	6	1620
111-7	7	2270
111-8	8	3180

Note

If the residual plate current of a tube is high, improper operation of the relay in the circuit in which that particular tube is a part will result. When an external audio signal is applied to the tube the relay will operate in the usual manner, but when the signal is removed the relay will not release. This is well demonstrated in the use of Test Unit BC-914. When the section of which this tube is a part is tested the light will flash on when modulation is applied, but it will not turn off when that modulation is removed. The only corrective measure is a replacement of the tube.

5. R-F ALIGNMENT OF RADIO RECEIVER AND SELECTOR BC-617-T2.

a. EQUIPMENT REQUIRED.

(1) 1 six-cell storage battery.

(2) Target Control Transmitting Equipment RC-65.

(3) 1 low capacity, narrow-blade, aligning screw driver.

(4) 1 Test Set IE-72.

b. R-F ALIGNMENT.

Note

The alignment procedure given below is intended for a bench test in conjunction with Target Control Transmitting Equipment RC-65.

(1) Connect the green plug of Test Unit I-201 (part of Test Set IE-72) to the "LIMITER" jack on Radio Receiver and Selector BC-617-T2 plug.

(2) Set the "SQUELCH" switch of the receiver to the "OFF" position.

(3) Connect the storage battery and throw the switch of Radio Control Box BC-491-T2 to the "ON" position. Allow approximately 30 seconds for the tubes to reach operating temperatures.

(4) Turn on Radio Modulator and Transmitter BC-483-T2 or Radio Modulator and Transmitter BC-925 as a signal source.

(5) Insert a wire approximately 2 feet long into the "ANT" connection of Radio Receiver and Selector BC-617-T2. The length of the wire can be adjusted to keep the limiter grid current less than 20 microamperes as measured on the microammeter of Test Unit I-201.

(6) Adjust all transformer trimmers except those on the discriminator transformer 124 for the maximum limiter grid current. (See figure 5-1.)

Note

If the limiter grid current is permitted to exceed 20 microamperes because of excessive input, the limiter will become saturated making it difficult to read a maximum current on the test unit meter while peaking the trimmers.

(7) If no signal is received at this point the oscillator stage may not be operating properly. (See figures 8-12 and 5-1.)

(a) Connect a standard volt-ohmmeter from the screen grid of the oscillator tube (socket 109-9, lug 4) to ground and tune the trimmer 171-A on transformer 122 for maximum screen voltage.

(b) Tune trimmer 171-B on the same transformer for maximum limiter-grid current.

(8) Remove the short antenna from "ANT" of the receiver and insert one of greater length to obtain the approximate maximum input.

(9) Change the green plug of Test Unit I-201 to the "DISC" jack and adjust the secondary trimmer marked 172-4B on transformer 124 of the discriminator to a point where the microammeter swings sharply through zero, and set at approximately 10 microamperes.

Note

Since the trimmers in the discriminator circuit are quite sensitive to small changes in capacity use a low capacity screw driver when adjusting them.

(10) Adjust the primary trimmer (172-4A) for maximum deflection on the microammeter of the test unit.

(11) Readjust the secondary trimmer (172-4B) for approximate zero indication (not more than one microampere off zero).

(12) Connect the yellow plug of Test Unit I-201 to the "METER-OUTPUT" jack of the receiver. Apply a 2270-cycle audio tone, #7 (UP), from the transmitter and retune the primary trimmer (172-4A) for a maximum reading as indicated in the audio meter of the test unit. If maximum reading is above or below the top of the green section, adjust the "VOLUME" control on the receiver panel so that the meter pointer rests at the top of the green section.

(13) Make sure that a slight rocking of secondary trimmer 172-4B causes a corresponding deflection of the microammeter above or below zero. The trimmer must be left in the position giving a zero meter reading.

6. I-F ALIGNMENT AND GAIN CHECK.

a. EQUIPMENT REQUIRED.

(1) 1 six-cell storage battery.

(2) 1 signal generator (such as Signal Generator I-208 or I-208-A).

(3) 1 Test Set IE-72.

b. PROCEDURE.—When trouble is suspected in the i-f section a stage by stage check of the i-f alignment (see figs. 8-12 and 5-1) may be made in the following manner:

(1) Set the signal generator to a frequency of 3 megacycles and an output of approximately 1.6 volts.

(2) Connect the output of the signal generator to the grid (lug 4, socket 109-5) of the limiter tube (V-6).

(3) Connect the green plug of the Test Set I-201 to the "DISC" jack and adjust the secondary trimmer (172-4B) on transformer 124 to a point where the microammeter swings sharply through zero, and set at approximately 10 microamperes.

(4) Adjust the primary trimmer (172-4A) for maximum deflection on the microammeter of the test unit.

(5) Re-adjust the secondary trimmer (174-4B) for approximately zero indication (not more than one microampere off zero).

(6) Change the green plug of Test Unit I-201 to the "LIMITER" jack of Radio Receiver and Selector BC-617-T2.

(7) Connect the signal generator to the grid (lug 4 of socket 109-4) of the second i-f amplifier tube (V-5) and tune the trimmers of transformer 123-3 for maximum grid current. Reduce the signal generator output so that the limiter grid current is less than 20 microamperes.

(8) Connect the signal generator to the grid (lug 4 of socket 109-3) of the first i-f amplifier tube (V-4) and tune the trimmers of transformer 123-2 for maximum grid current. Reduce the signal generator output so that the limiter grid current is less than 20 microamperes.

(9) Connect the signal generator to the grid (lug 8 of socket 109-2) of the converter tube (V-2) and tune the trimmers of transformer 123-1 for maximum grid current. Reduce the signal generator output so that the limiter grid current is less than 20 microamperes.

(10) After the above alignment the discriminator circuit should accommodate frequency deviation up to plus or minus 35 kilocycles per second.

Note

If the trouble has been definitely located in one of the r-f or i-f stages and all component parts, wiring, and tubes check satisfactorily, the trouble probably lies in the associated r-f or i-f transformer. If mechanical inspection of the transformer assembly does not disclose some simple trouble which can be easily repaired, remove the item and replace it with a new one.

7. STAGE SENSITIVITY CHECK.

Note

The following information covering a check on the stage sensitivity is included for the use of higher echelon groups who have the necessary equipment to complete a check of this nature. Voltage information was furnished by the manufacturer who had adequate measuring equipment available. All but the second i-f amplifier grid circuit may be checked with the average signal generator. To check the second i-f amplifier properly, special equipment will be required.

a. TO SET UP REFERENCE INPUT VALUE. *(See figure 8-12 and table 5-2.)*

(1) Connect a signal generator (one capable of delivering an accurate output of from 200 to 150,000 microvolts, such as Ferris, Model 40-A) to the "ANT" connection of Radio Receiver and Selector BC-617-T2.

(2) Connect the green plug of Test Unit to the "LIMITER" jack on the receiver panel.

(3) Apply a 300-microvolt signal from the signal generator.

(4) Check the meter reading of the test set. The meter should read 5 microamperes. If the reading is above or below this value remove the plug over the "CRC" connection on the panel of the receiver and adjust the control until a reading of 5 microamperes is obtained on the test meter.

b. TO CHECK THE FIRST R-F AMPLIFIER GRID INPUT.

(See figures 8-11 and 8-12.)

(1) Connect the signal generator to the grid (lug 4 of socket 109-1) of the first r-f amplifier tube (V-1) and apply a signal of 800 microvolts.

(2) Check the microammeter of Test Unit I-201 for a reading of 5 microamperes.

(3) If the meter does not read 5 microamperes adjust the input from the signal generator until it does. A deviation of not over 3 decibels from a suggested input signal of 800 microvolts (see Table 5-2) is satisfactory.

c. TO CHECK THE CONVERTER R-F GRID INPUT.—Connect the signal generator to the grid (lug 8 of socket 108-2) of the converter tube (V-2) and apply a signal of 10,000 microvolts. A deviation of 3 decibels to obtain a reading of 5 microamperes on the test unit is satisfactory.

d. TO CHECK THE CONVERTER I-F CONTROL GRID INPUT.—Connect the signal generator to the control grid (lug 5 of socket 109-2) of the converter tube (V-2) and apply a signal of 12,000 microvolts. A deviation of 3 decibels to obtain a reading of 5 microamperes on the test unit is satisfactory.

e. TO CHECK THE FIRST I-F AMPLIFIER GRID INPUT.—Connect the signal generator to the grid (lug 4 of the socket 109-3) of the first i-f amplifier tube (V-4) and apply a signal of 15,000 microvolts from the signal generator. A deviation of 3-db to obtain a reading of 5 microamperes on the test unit is satisfactory.

f. TO CHECK THE SECOND I-F AMPLIFIER GRID INPUT.—Connect the signal generator to the grid (lug 4 of the socket 109-4) of the second i-f amplifier tube (V-5) and apply a signal of 120,000 microvolts from the signal generator. A deviation of 3-db necessary to obtain a reading of 5 microamperes on the test unit is satisfactory.

Note

It may be impossible to comply with step *f* as information therein was obtained on special equipment used by the manufacturer.

TABLE 5-2
R-F INPUT VALUES FOR VARIOUS STAGES

Place	*Frequency*	*Microvolts* input for 5 microamperes grid current*
Antenna	r-f	300
First r-f amp. grid	r-f	560 to 1150
Converter grid	r-f	8000 to 14,000
Converter grid	r-f	8500 to 16,900
First i-f amp. grid	r-f	10,600 to 21,000
Second i-f amp. grid	r-f	85,000 to 169,000

* Values in microvolts take into account the permissible ± 3-db variation.

8. CHECK OF CHANNEL FREQUENCY DEVIATION LIMITS.

Note

It is important that the calibration accuracy of the audio oscillator used in this check be determined. An audio oscillator containing a method of self calibration (such as General Radio 913-A) is recommended. Suggestions for calibrating uncalibrated oscillators may be found in SECTION VI.

a. Connect an audio oscillator to the "DISC" jack of Radio Receiver and Selector BC-617-T2.

b. Remove the cap from the "VOLUME" control on the receiver panel and turn adjustment full on (full clockwise position).

c. Connect yellow plug of Test Unit I-201 to the "METER OUTPUT" on the receiver panel.

d. Turn on the audio oscillator, set the dial to 2270 cycles (optional frequency), and adjust the gain control of the oscillator until the audio meter of Test Unit I-201 reads full scale.

e. Adjust the "VOLUME" control of the receiver until the pointer of the audio meter of the test unit rests at the top of the green section.

f. Rotate the audio oscillator through the complete frequency range and check for meter variances at each of the nominal channel frequencies. (See table 3.)

Note

> As the eight channel frequencies are checked the meter will vary slightly plus or minus from the top of the green section. This is an approximate setting for the oscillator gain and is not critical.

g. Connect the "REC-SEL" socket of Test Unit BC-914 to the "ACTUATOR-UNIT" socket of Radio Receiver and Selector BC-617-T2.

h. Turn the audio oscillator dial through each of the eight channel frequencies as shown in the table below. Indicator lights on Test Unit BC-914 will light for corresponding frequencies within the limits of plus or minus 3 percent of the nominal frequency shown in Table 5-3.

TABLE 5-3. ALLOWABLE AUDIO FREQUENCY LIMITS FOR NOMINAL FREQUENCIES

Channel	*Nominal Frequency (cycles)*	*Allowable Audio Frequency Limits (cycles)*	*Activated Indicator Light on Test Unit BC-914*
1	300	291 — 309	1 (Reset)
2	420	407.4 — 432.6	2 (Step)
3	590	572.3 — 607.7	3 (Fast)
4	825	800-25 — 849-75	4 (Slow)
5	1155	1120.35 — 1189.65	5 (RT)
6	1620	1571.4 — 1668.6	6 (Left)
7	2270	2201.9 — 2338.1	7 (UP)
8	3108	3084.6 — 3275.4	8 (Down)

i. If all frequencies are found to be within the required limits of plus or minus 3 percent, disconnect the audio oscillator and apply a signal of 2270 cycles [#7 (UP), modulated 5 kilocycles] from the transmitter. Readjust the receiver "VOLUME" control so the meter pointer of the audio meter in Test Unit I-201 is at the top of the green section.

9. CHECK OF RELAY UNIT BC-622-AZ AND SELECTOR RELAYS OF THE RECEIVER.

a. CHECK FROM A LOCAL POSITION.

(1) Disconnect the servo-gyro cable (green) and servo cable (red) from the servo junction box (not part of Target Control Receiving Equipment RC-64-T9) and the auxiliary cable (yellow) from the auxiliary equipment functions box (not part of Target Control Receiving Equipment RC-64-T9).

(2) Connect the auxiliary cable (yellow) to the "AUX-FUNCTIONS" socket of Test Unit BC-914.

(3) Connect the servo-gyro cable (green) to the "SERVO-GYROS" socket of the test unit.

(4) Connect the servo cable (red) to the "SERVO-VALVES" socket of the test unit.

(5) Connect the Control (stick) Box BC-756 (a part of Target Control Transmitting Equipment RC-65 and RC-65-Z) to the radio socket (blue) of Relay Unit BC-622-AZ.

(6) Throw the "REMOTE-LOCAL" switch of the relay unit to "LOCAL" position.

(7) Operate Control (stick) Box BC-756 in accordance with Table 5-4, checking for illumination of the proper indicator light on Test Unit BC-914 with the corresponding movements of the controls on Control Box BC-756.

b. CHECK FROM A REMOTE TRANSMITTER.

(1) Place control plane near receiving unit (Radio Receiver and Selector BC-617-T2).

(2) Connect the auxiliary cable (yellow) to the "AUX-FUNCTIONS" socket of Test Unit BC-914.

(3) Connect the servo-gyro cable (green) to the "SERVO-GYROS" socket of Test Unit BC-914.

(4) Connect the servo cable (red) to the "SERVO-VALVES" socket of the test unit.

(5) Disconnect Control (stick) Box BC-756 and connect the radio cable (blue) to the "ACTUATOR-UNIT" socket of the receiver.

(6) Throw "REMOTE-LOCAL" switch on Relay Unit BC-622-AZ to "REMOTE" position.

(7) Turn on Target Control Transmitter RC-65 or RC-65-Z and use Control (stick) Box BC-756 of the transmitter as a control for testing the receiving equipment.

(8) Operate Control (stick) Box BC-756 in accordance with table 4, checking for illumination of the proper indication lights on Test Unit BC-914 with the corresponding movements of the controls on Control Box BC-756.

c. CHECK FROM REMOTE TRANSMITTER WITHOUT TEST UNIT BC-914.

(1) Connect the servo-gyro cable (green) and servo cable (red) to the servo junction box and the auxiliary cable (yellow) to the auxiliary functions box.

(2) Proceed with test as given in Section II, paragraph 2.

10. CHECK OF RELAY UNIT BC-418-Z.

TABLE 5-4. GENERAL FUNCTIONS OBTAINED FROM THE SIX BASIC FUNCTIONS OF THE STEPPER RELAY POSITIONS OF RELAY UNIT BC-622-AZ

Stepper Relay Position	*A Lights Energized by Stepper **	*B Additional Lights on when Channels 3 and 4 are applied †*		*Additional Lights on when Channels 5 and 6 are applied ‡*		*Additional Lights on when Channels 7 and 8 are applied §*	
	Light	*Light*	*Channel*	*Light*	*Channel*	*Light*	*Channel*
1 (Auto)	Aileron Center Uncage	Fast Slow	(3) (4)	Right Rudder Left Rudder	(5) (6)	Up Down	(7) (8)
2 (Turn)	Rudder Center Cage	Fast Slow	(3) (4)	Right Aileron Left Aileron	(5) (6)	Up Down	(7) (8)
3 (Brake)	Aileron Center Uncage	Brake On Brake Off	(3) (4)	Right Rudder Left Rudder	(5) (6)	Up Down	(7) (8)
4 (Pitch)	Aileron Center Uncage	Increase Pitch Decrease Pitch	(3) (4)	Right Rudder Left Rudder	(5) (6)	Up Down	(7) (8)
5 (Flaps)	Aileron Center Uncage	Up Flaps Down Flaps	(3) (4)	Right Rudder Left Rudder	(5) (6)	Up Down	(7) (8)
6 (Gear)	Aileron Center Uncage	Up Gear Down Gear	(3) (4)	Right Rudder Left Rudder	(5) (6)	Up Down	(7) (8)
7	Aileron Center Uncage	No. 7 On No. 7 Off	(3) (4)	Right Rudder Left Rudder	(5) (6)	Up Down	(7) (8)
8	Aileron Center Uncage	No. 8 On No. 8 Off	(3) (4)	Right Rudder Left Rudder	(5) (6)	Up Down	(7) (8)
9	Aileron Center Uncage	No. 9 On No. 9 Off	(3) (4)	Right Rudder Left Rudder	(5) (6)	Up Down	(7) (8)

* Stepper up and down movement of "STEP RESET" lever.
† Channels 3 and 4 refer to the two positions of the "INCREASE UP-DOWN DECREASE" lever.
‡ Channels 5 and 6 refer to the right and left positions of control (stick) lever.
§ Channels 7 and 8 refer to the up and down positions of control (stick) lever.

Relay Unit BC-418-Z contains a relay which remains closed as long as sufficient carrier-frequency energy is present to close the carrier relay (131, figure 8-12) in Radio Receiver and Selector BC-617-T2. The unit is adjusted at the factory in such a way that if the carrier frequency is not present for a period of five seconds the plane is put into a slow climb and right turn. If the timing is inaccurate or if a change is desired in the timing, adjust the relay as follows.

a. Remove the four screws at each corner of the panel of the relay unit and remove unit from metal case.

b. Remove the two screws holding the housing cover of the relay unit and remove the cover.

c. Turn the adjustment screw, located in the top of the relay unit, marked "INCREASE-DECREASE" until the proper time release is obtained. Turn toward "DECREASE" to decrease the time delay and toward "INCREASE" to increase the time delay.

d. Turn on Target Control Receiving Equipment RC-64-T9 by throwing the "ON-OFF" switch of Radio Control Box BC-491-T2 to the "ON" position. The "DELAY-RELAY" light on the panel of Relay Unit BC-418-Z will light.

e. Turn on Target Control Transmitting Equipment RC-65 in a nearby control plane or station by throwing

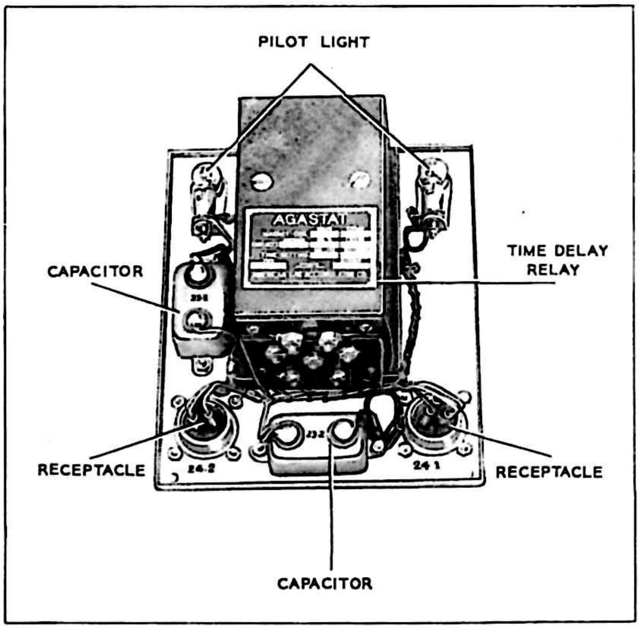


Figure 5-3. Relay Unit BC-418-Z—Interior View

the "OPERATE" switch of Control Box BC-756 to the "ON" position. When the carrier-frequency from the transmitter is received the "DELAY-RELAY" light will go out and the "CARRIER-RELAY" light will light.

f. Turn off the transmitter. After a pre-determined time interval the "CARRIER-RELAY" light will go out and the "DELAY-RELAY" light will light. The time interval between the action of the lights will indicate the time delay action of the relay. Adjustment may be made accordingly.

11. VOLTAGE DATA.

The voltages given below were taken with a 1000-ohm-per-volt voltmeter.

TABLE 5-5. TUBE VOLTAGES

TUBES	*TERMINALS*							
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1st R.F. Amp. (V-1)	0 Shell	0 Heater	2.3-5 Suppressor	0 Grid	2.3-5 Cathode	64-68 Screen	13.5 Heater	215-227 Plate
Converter (V-2)	0 Shell and Grid #5	0 Heater	225-237 Plate	43 Grid #2 and #4	0-4 Grid #1	3.2-6.4 Cathode	13.5 Heater	0 Grid #3
Oscillator (V-3)	0 Shell	0 Heater	0 Suppressor	.1 Grid	0 Cathode	120-122.5 Screen	13.5 Heater	215-231 Plate
1st I.F. Amp. (V-4)	0 Shell	0 Heater	4-5.4 Suppressor	0 Grid	0.0-5.8 Cathode	121 Screen	13.5 Heater	215-226 Plate
2nd I.F. Amp. (V-5)	0 Shell	0 Heater	4.2-5.2 Suppressor	0 Grid	4-7-5.8 Cathode	112-116 Screen	13.5 Heater	215-220 Plate
Limiter (V-6)	0 Shell	0 Heater	0.9-1.6 Suppressor	0 Grid	0.9-1.6 Cathode	58-68 Screen	13.5 Heater	53-63 Plate
Discriminator (V-7)	0 Shell	7.2 Heater	0 Plate #2	.1 Cath. #2	.02 Plate #1	N.C.	0 Heater	.2 Cath. #1
1st A.F. Amp. (V-8)	0 Grid #2	100-103 Plate #2	3.3-3.8 Cath. #2	.02 Grid #1	226 Plate #1	13.5 Cath. #1	13.5 Heater	0 Heater
2nd A.F. Amp. (V-9)	.01 Grid #2	220-226 Plate #2	7.5-8.2 Cath. #2	.01 Grid #1	225 Plate #1	8.2 Cath. #1	13.5 Heater	0 Heater
Channel #1 (V-10)	0 Grid #2	230 Plate #2	6.4-8 Cath. #2	0 Grid #1	225 Plate #1	13.5 Cath. #1	0 Heater	13.5 Heater
Channel #2 (V-11)	0 Grid #2	225-230 Plate #2	6.5-8 Cath. #2	0 Grid #1	221-225 Plate #1	13.5 Cath. #1	0 Heater	13.5 Heater
Channel #3 (V-12)	0 Grid #2	225-230 Plate #2	7.8-8 Cath. #2	0 Grid #1	225 Plate #1	13.5 Cath. #1	0 Heater	13.5 Heater
Channel #4 (V-13)	0 Grid #2	225-230 Plate #2	7.8-8 Cath. #2	0 Grid #1	214-225 Plate #1	13.5 Cath. #1	0 Heater	13.5 Heater
Channel #5 (V-14)	0 Grid #2	225-234 Plate #2	8.6-8 Cath. #2	0 Grid #1	222-225 Plate #1	13.5 Cath. #1	0 Heater	13.5 Heater
Channel #6 (V-15)	0 Grid #2	225-234 Plate #2	7.8-8 Cath. #2	0 Grid #1	224-225 Plate #1	13.5 Cath. #1	0 Heater	13.5 Heater
Channel #7 (V-16)	0 Grid #2	225-234 Plate #2	8 Cath. #2	0 Grid #1	225 Plate #1	13.5 Cath. #1	0 Heater	13.5 Heater
Channel #8 (V-17)	0 Grid #2	225-234 Plate #2	8 Cath. #2	0 Grid #1	225 Plate #1	13.5 Cath. #1	0 Heater	13.5 Heater

12. RESISTANCE DATA.

The following table gives the resistance at the tube socket terminals. The tube resistances were measured to ground with tubes in the sockets and the squelch switch off.

TABLE 5-6. RESISTANCE AT TUBE SOCKET TERMINALS

TUBES	*TERMINALS*							
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1st R.F. Amp. (V-1)	0 Shell	0 Heater	399 Suppressor	800M Grid	300 Cathode	100M Screen	1 Heater	2300 Plate
Converter (V-2)	0 Shell and Grid #5	0 Heater	2400 Plate	120M Grid #2 and #4	28M Grid #1	1400 Cathode	1 Heater	17 Grid
Oscillator (V-3)	0 Shell	0 Heater	0 Suppressor	53M Grid	1 Cathode	52M Screen	1 Heater	2200 Plate
1st I.F. Amp. (V-4)	0 Shell	0 Heater	450 Suppressor	800M Grid	460 Cathode	58M Screen	1 Heater	2400 Plate
2nd I.F. Amp. (V-5)	0 Shell	0 Heater	400 Suppressor	650M Grid	450 Cathode	52M Screen	1 Heater	2400 Plate
Limiter (V-6)	0 Shell	0 Heater	400 Suppressor	240M Grid	400 Cathode	14M Screen	1 Heater	15M Plate
Discriminator (V-7)	0 Shell	4 Heater	0 Plate #2	77M Cath. #2	135M Plate #1	N.C.	0 Heater	78M Cath. #1
1st A.F. Amp. (V-8)	500M Grid #2	52M Plate #2	1500 Cath. #2	300M Grid #1	7000 Plate #1	0 Cath. #1	1 Heater	0 Heater
2nd A.F. Amp. (V-9)	54M Grid #2	2000 Plate #2	750 Cath. #2	54M Grid #1	2200 Plate #1	750 Cath. #1	1 Heater	0 Heater
Channel #1 (V-10)	*34M Grid #2	1400 Plate #2	1500 Cath. #2	650 Grid #1	7200 Plate #1	6 Cath. #1	0 Heater	1 Heater
Channel #2 (V-11)	*34M Grid #2	1350 Plate #2	1500 Cath. #2	650 Grid #1	7500 Plate #1	6 Cath. #1	0 Heater	1 Heater
Channel #3 (V-12)	*35M Grid #2	1300 Plate #2	1425 Cath. #2	550 Grid #1	7500 Plate #1	6 Cath. #1	0 Heater	1 Heater
Channel #4 (V-13)	*35M Grid #2	800 Plate #2	1350 Cath. #2	525 Grid #1	7500 Plate #1	6 Cath. #1	0 Heater	1 Heater
Channel #5 (V-14)	*34M Grid #2	840 Plate #2	1500 Cath. #2	175 Grid #1	7500 Plate #1	6 Cath. #1	0 Heater	1 Heater
Channel #6 (V-15)	*34M Grid #2	840 Plate #2	1450 Cath. #2	350 Grid #1	7000 Plate #1	6 Cath. #1	0 Heater	1 Heater
Channel #7 (V-16)	*34M Grid #2	890 Plate #2	1500 Cath. #2	350 Grid #1	7000 Plate #1	6 Cath. #1	0 Heater	1 Heater
Channel #8 (V-17)	*35M Grid #2	800 Plate #2	1500 Cath. #2	500 Grid #1	7000 Plate #1	6 Cath. #1	0 Heater	1 Heater

* Each measurement on Pin 1 of Channel #1 through Channel #8 was taken with the sensitivity control in maximum position.

SECTION VI
SUPPLEMENTARY DATA

1. TUBE COMPLEMENT.

The following table gives information on the vacuum tubes used in Radio Receiver and Selector BC-617-T2.

TABLE 6-1. TUBE INFORMATION

Quantity	*JAN Type Designation*	*VT Type Designation*	*Tube Ref. Number*	*Socket Ref. Number*	*Function*
1	JAN-12SK7	VT-131	V-1	109-1	R.F. Amplifier
1	JAN-12SA7	VT-161	V-2	109-2	Converter
1	JAN-12SJ7	VT-162	V-3	109-9	Oscillator
1	JAN-12SK7	VT-131	V-4	109-3	1st I.F. Amplifier
1	JAN-12SK7	VT-131	V-5	109-4	2nd I.F. Amplifier
1	JAN-12SJ7	VT-162	V-6	109-5	Limiter
1	JAN-6H6	VT-90	V-7	109-6	Discriminator
1	JAN-12SN7GT		V-8	109-7	1st Audio Amplifier
1	JAN-12SN7GT		V-9	109-8	2nd Audio Amplifier
1	JAN-12SN7GT		V-10	109-11	Channel 1 (300 cycles)
1	JAN-12SN7GT		V-11	109-12	Channel 2 (420 cycles)
1	JAN-12SN7GT		V-12	109-13	Channel 3 (590 cycles)
1	JAN-12SN7GT		V-13	109-14	Channel 4 (825 cycles)
1	JAN-12SN7GT		V-14	109-15	Channel 5 (1155 cycles)
1	JAN-12SN7GT		V-15	109-16	Channel 6 (1620 cycles)
1	JAN-12SN7GT		V-16	109-17	Channel 7 (2270 cycles)
1	JAN-12SN7GT		V-17	109-18	Channel 8 (3180 cycles)

2. GENERAL.

a. FREQUENCY.

(1) Range of 30 to 40 megacycles.

(2) Stability of one cycle per megacycle.

(3) Shift of 15 kilocycles.

b. ANTENNA.—Shunt fed; ¼ wave.

c. CURRENT.

(1) Six tubes drawing .15 ampere.

(2) Eleven tubes drawing .3 ampere.

(3) Other current consumption of 4 amperes.

(4) Total current consumption of 8.2 amperes.

(5) Maximum starting surge of 12 amperes.

3. AUDIO OSCILLATOR CALIBRATION.

It is important that the calibration accuracy of the audio oscillator be determined. It is for this reason that an audio oscillator containing a method of self calibration (such as General Radio 913-A) is recommended. If the frequency of one particular channel is accurate to within plus or minus 3 percent of the nominal frequency but the next channel to be checked should show a difference of over plus or minus 3 percent, the fault would indicate a defective filter section (116 or 117) especially if the third channel to be checked was within the plus or minus 3 percent tolerance. If all eight channels (or four channels of a filter section) indicate a deviation of more than plus or minus 3 percent from the nominal frequency, the audio oscillator may not be calibrated correctly. Two methods for calibrating an uncalibrated oscillator are given below.

a. CALIBRATING AN OSCILLATOR WITH AN OSCILLOSCOPE AND TUNING FORK.

(1) Connect the tuning fork to the one set of plates of the oscilloscope and the audio oscillator to the other set of plates.

(2) Tune the oscillator to the known tuning fork frequency and a circle should appear on the screen of the oscilloscope if the tuning fork frequency corresponds to the oscillator frequency.

b. CALIBRATING AN OSCILLATOR WITH RECEIVER OF KNOWN ACCURACY.—Another simple method of calibrating an uncalibrated oscillator is to check the oscillator output by using a receiver which is known to be approximately accurate. This method is not as accurate as calibration by a tuning fork but will serve when other equipment is not available. Using Test Unit BC-914 proceed as follows:

(1) Connect the audio oscillator to the "DISC" jack of Radio Receiver and Selector BC-617-T2.

(2) Connect the "REC-SEL" socket of Test Unit BC-914 to the "ACTUATOR UNIT" socket of Radio Receiver and Selector BC-617-T2.

(3) Connect yellow plug of Test Unit I-201 to the "METER OUTPUT" on the receiver panel.

(4) Turn on the audio oscillator and adjust the gain so that the audio meter pointer of the test unit is in the green section of the dial.

(5) Rotate the dial of the oscillator, starting at the low end. The first light (AUTO) on Test Unit BC-914 should light at 300 cycles and the next at 420 cycles and so on through the eight channels. Notice the deviation limits on the dial for each channel frequency (space on dial of oscillator in which light remains on) and mark the dial at the center point of the deviation limits for each of the eight channel frequencies. The oscillator dial marked in this manner will serve to check the approximate accuracy of channel frequencies in other receivers of which there is some doubt.

4. OPERATING SENSITIVITY CHECK OF RADIO RECEIVER AND SELECTOR BC-617-T2.

Check the sensitivity of Radio Receiver and Selector BC-617-T2 by a range check of from 6 to 7 miles. It is recommended that the receiver be tested while the plane is in flight with a safety pilot, the plane being controlled from a remote point to enable the safety pilot to make the necessary adjustments. The transmitter being used to complete the test may be located in another plane in flight or on the ground. By using the receiver in a plane which is in flight the receiver can be adjusted for the correct maximum allowable sensitivity because is is away from regular ground noises emanating from other transmitters, hangar noise, or other electrical disturbances. Excessive noise will cause the relays of the receiver to operate in the same manner as a signal from the transmitter. A receiver adjusted on the ground so the sensitivity is low enough to compensate for the occasional high peaks (which would operate the relays at every high noise peak) may cause the overall sensitivity to be so low the receiver will not operate efficiently over the required distance or range. A testing distance of 6 to 7 miles is suggested for sensitivity adjustment because a transmitter in close proximity may over-ride noise which would operate the relay if the transformer were further away. The overall sensitivity should not be so high (or on the edge of the point where the relays cut in) that the relays will operate when the plane is flown from a section of low noise level into a section with a higher noise level. *This can be especially important when landing a ship (nullo) into a section with high electrical disturbances.*

5. TYPCIAL OPERATIONAL PROCEDURE USED IN AVERAGE FLIGHT.

a. TAKE-OFF.

Note

> The target plane is taxied to the end of the landing strip and placed in position for a take-off by a pilot operating manual controls. Then the pilot leaves the plane.

(1) PRELIMINARY.

(a) From the control plane the pilot assures himself that the Control Box BC-756 (not part of Radio Receiver and Selector RC-64-T9) is at the "AUTO" function by pushing the lever of the "STEP-RESET" switch to the "RESET" position.

(b) To make certain the plane is properly lined up with the runway, push the lever of the "STEP-RESET" switch to the "STEP" position which activates the "TURN" function of the control box, caging the gyro and giving gyro alignment to the runway.

(2) TAKE-OFF RUN.

(a) Push the lever of the "STEP-RESET" switch to "RESET" position again activating the "AUTO" function. The throttle speed may then be increased by pushing the "INCREASE UP-DOWN DECREASE" lever to "INCREASE" position. The stick functions are also applied to the rudder and elevator with the "AUTO" function activated. This assures the pilot that he may give right rudder pressure for torque correction and control against cross winds. The elevator is available for pulling the ship off the ground.

(b) The landing gear may be raised by keying the "STEP-RESET" switch to the "STEP" position five times, passing through "TURN," "BRAKE," "PITCH" and "FLAPS" to "GEAR." The "INCREASE UP-DOWN DECREASE" lever will then raise the gear when placed in the "INCREASE UP" position. The control stick will give right and left rudder and up and down elevator.

Note

When stepping up to "GEAR" function, or any function past "TURN," the operator must pass through "TURN" very rapidly. If it stays in "TURN" function too long, it will automatically center the rudder removing the right rudder pressure necessary to keep the plane in line with the runway.

b. FLIGHT.—Actual flight of the target plane is controlled by use of the "AUTO" and "TURN" functions of Control Box BC-756. For straight flight the "AUTO" function is utilized while the "TURN" function is necessary for turns. On straight flight the automatic function of the control box activates the servo unit, utilizing the rudder gyro which automatically holds the plane to its course. Occasional movements of the control stick to right or left will correct drift. Immediately after take-off either "TURN" or "AUTO" function may be desired, depending upon the situation. If continuation of the take-off course is desired the "STEP-RESET" switch is thrown to the "RESET" position while the landing gear is still in the process of being raised, giving immediate control in the "AUTO" position. This function allows right and left rudder, up and down elevator, and fast and slow throttle. If a turn is desired after leaving the runway, "AUTO" function is obtained in the same manner as above but one push of the "STEP-RESET" lever to "STEP" will be necessary to give "TURN" function on the control box, giving up and down elevator, fast and slow throttle and right or left aileron, with the rudder caged. After the turn is made the control box is again reset to "AUTO."

c. LANDING OPERATIONS.—As the target plane is brought into the down-wind leg the motor is throttled back to 110 miles an hour while maintaining a constant altitude at 400 feet. The landing gear is then lowered, and the plane continues around the base leg. On the final approach (well back) the motors are throttled down and the glide speed reduced to 90 to 100 miles an hour by lowering the flaps. On contact the brakes are applied and the flight is complete.

(1) Throttle control is obtained while the control box function is on "TURN" or "AUTO" function.

(2) To obtain "GEAR" function from "AUTO" or "TURN," the "STEP" lever of the "STEP-RESET" switch is keyed through "BRAKE," "PITCH" and "FLAPS." This is accomplished by throwing the "INCREASE UP-DOWN DECREASE" switch to "DOWN DECREASE." The rudder and elevator are controlled by the stick while at this position.

Note

It is not necessary to hold "GEAR" position on the control box until the gear is down. More complete control of the plane is assured by resetting to "AUTO" at once.

(3) To obtain control of the plane and to make the turn into the base leg, it is necessary to change the control box from "GEAR" to "AUTO" and then step to the "TURN." To obtain "AUTO" push the "STEP-RESET" switch to "RESET" after which the switch is thrown to "STEP" to obtain the desired "TURN" function.

(4) The throttle control is available while the control box is at the "TURN" function by use of the "UP INCREASE-DOWN DECREASE" switch.

(5) To lower the flaps, being in "AUTO" function, the "STEP-RESET" switch must be thrown to the "STEP" position four times to pass through "TURN," "BRAKE" and "PITCH" to give the control box the "FLAP" function by use of the "UP INCREASE-DOWN DECREASE" switch. Up and down elevator and right and left rudder are available in this position, which permits proper alignment of the plane on the runway by use of the rudder allowing proper rudder pressure for motor torque and cross winds.

(6) To obtain use of the brakes from the "FLAP" function, push the "STEP-RESET" switch to "RESET" which resets the function of the control box to "AUTO." Push the "STEP-RESET" switch to the "STEP" position two times to give the control box "BRAKE" function by use of the "UP INCREASE-DOWN DECREASE" switch. Elevator and rudder will remain available on the control stick.

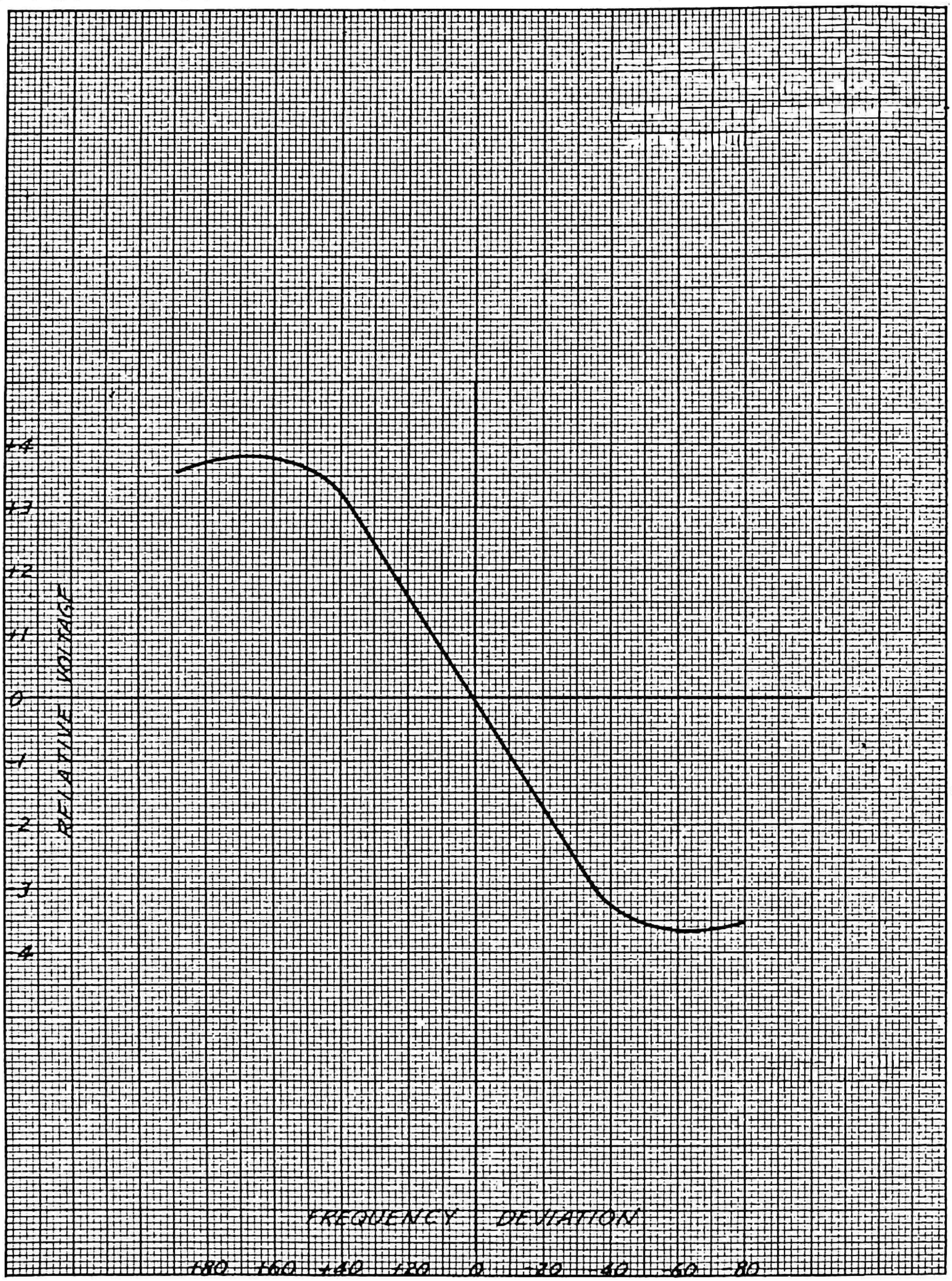


Figure 6-1. Radio Receiver and Selector BC-617-T2—Discriminator Curve

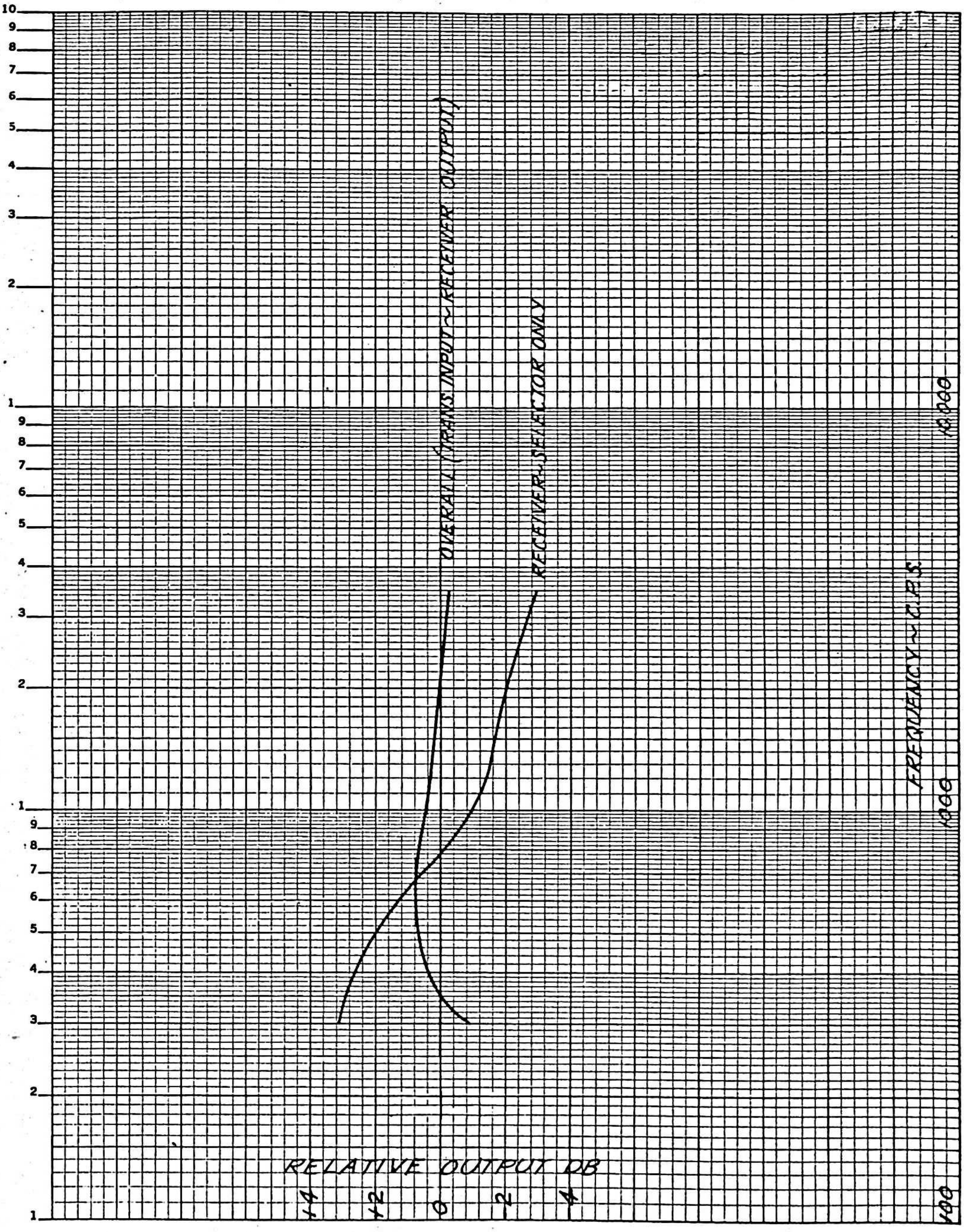


Figure 6-2. Radio Receiver and Selector BC-617-T2—Fidelity Curve

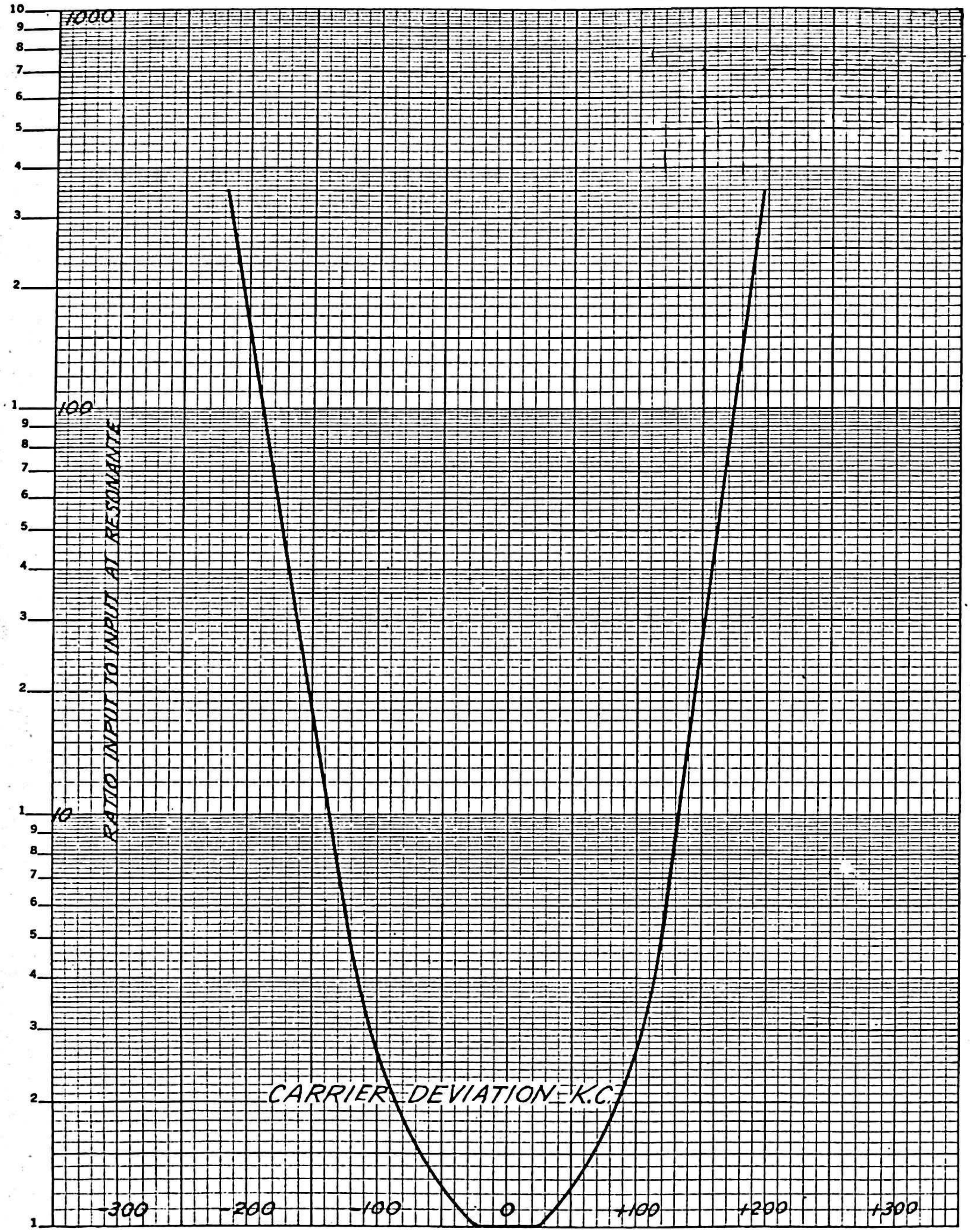


Figure 6-3. Radio Receiver and Selector BC-617-T2—Selectivity Curve

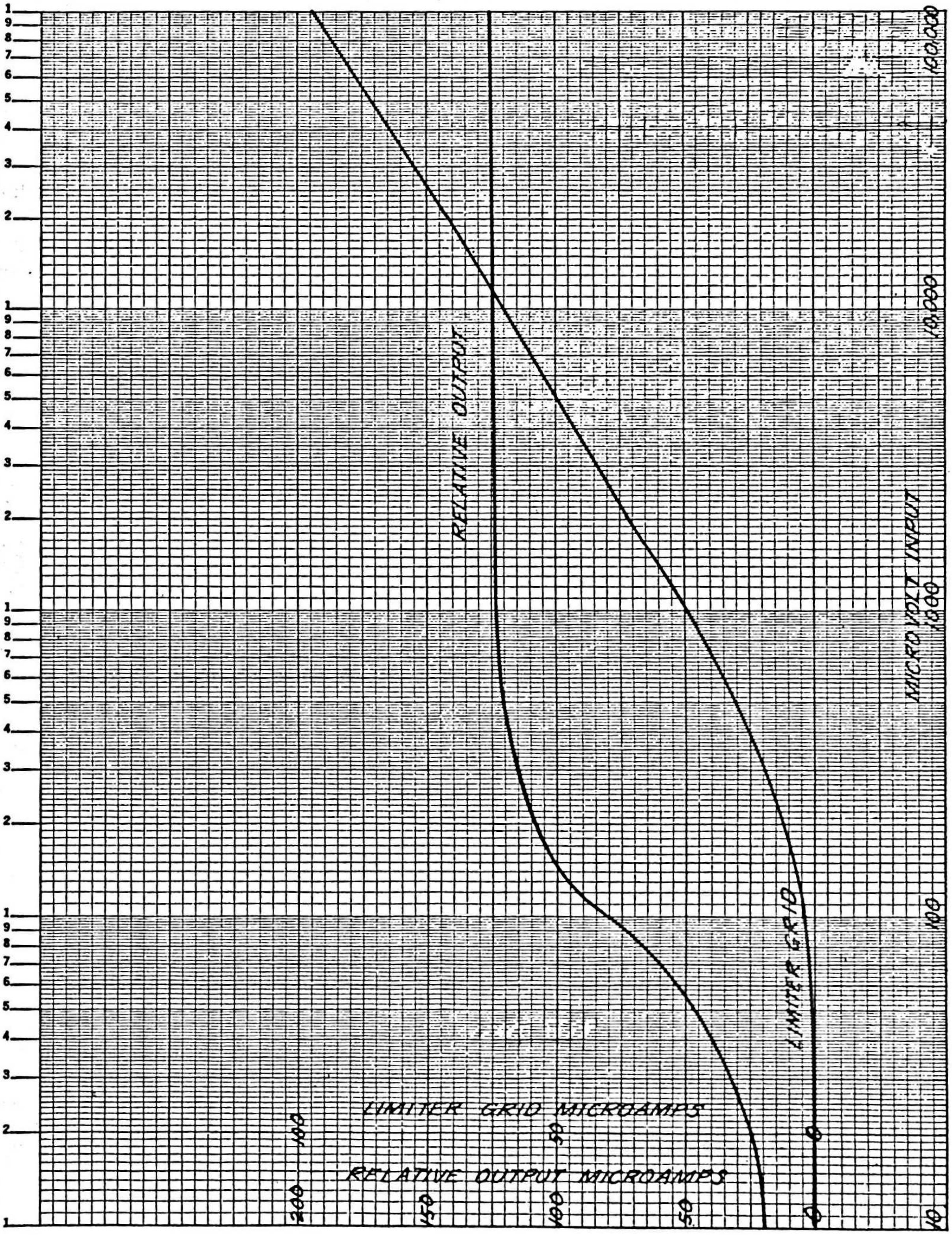


Figure 6-4. Radio Receiver and Selector BC-617-T2—Sensitivity Curve

SECTION VII
PARTS CATALOGUE

Introduction

Table of Parts

The parts listed in this table do not constitute a complete electrical and mechanical breakdown of the equipment. The table lists all electrical parts together with such operative mechanical parts as are subject to loss or failure, with the exception of structural and minor parts such as standard bolts, screws, nuts, and the like. In some instances individual detail parts of a sub-assembly may not be listed as separate items, since replacement of such items is impractical.

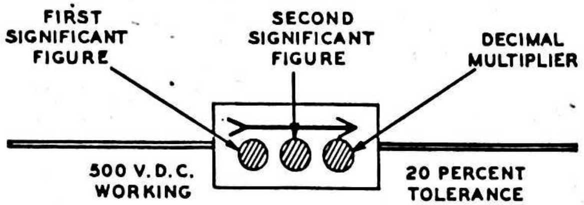
Ordering of Spare Parts

Each Service using this list has established certain depots and service groups for the storage and issue of spare parts to its organizations requiring them. The regulations of each Service should be studied to determine the method and source for requisitioning spare parts. The information in this list, as to manufacturer's or contractor's name, type, model, or drawing number, is not to be interpreted as authorization to field agencies to attempt to purchase identical or comparable spare parts directly from the manufacturer or a wholesale or retail store except under emergency conditions as covered by existing regulations of the Service concerned.

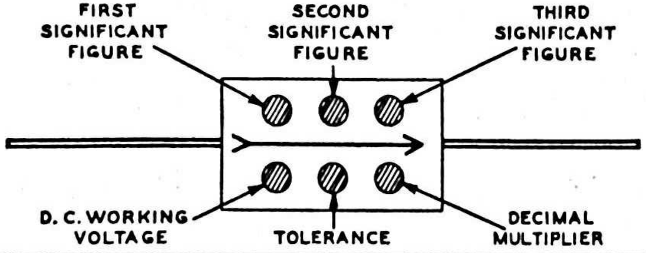
U. S. Army Personnel: This table is for information *only* and is not to be used as a basis for requisitioning parts. Authorities for obtaining maintenance items are as follows: 1. For using organizations: applicable Service publications of the 00-30 series of AAF Technical Orders. 2. For higher maintenance and supply echelons: applicable Service publications of the 08-55 series of AAF Technical Orders.

RMA COLOR CODES

CAPACITORS (MMFD)


FIRST SIGNIFICANT FIGURE
SECOND SIGNIFICANT FIGURE
DECIMAL MULTIPLIER
500 V.D.C. WORKING
20 PERCENT TOLERANCE

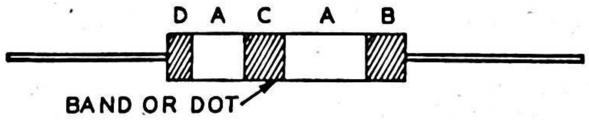
COLOR	NUMERAL	VOLTS	MULTIPLIER	TOLERANCE
BLACK	0		1	
BROWN	1	100	10	1%
RED	2	200	100	2%
ORANGE	3	300	1,000	3%
YELLOW	4	400	10,000	4%
GREEN	5	500	100,000	5%
BLUE	6	600	1,000,000	6%
VIOLET	7	700	10,000,000	7%
GRAY	8	800	100,000,000	8%
WHITE	9	900	1,000,000,000	9%
GOLD		1000	0.1	5%
SILVER		2000	0.01	10%
NO COLOR		500		20%


FIRST SIGNIFICANT FIGURE
SECOND SIGNIFICANT FIGURE
THIRD SIGNIFICANT FIGURE
D. C. WORKING VOLTAGE
TOLERANCE
DECIMAL MULTIPLIER

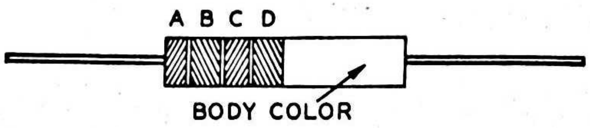
RESISTORS (OHMS)

COLOR	A 1st DIGIT	B 2nd DIGIT	C MULTIPLIER
SILVER			0.01
GOLD			0.1
BLACK		0	1.0
BROWN	1	1	10
RED	2	2	100
ORANGE	3	3	1,000
YELLOW	4	4	10,000
GREEN	5	5	100,000
BLUE	6	6	1,000,000
PURPLE	7	7	10,000,000
GRAY	8	8	100,000,000
WHITE	9	9	

D — TOLERANCE CODE:
GOLD = 5% SILVER = 10% NO COLOR = 20%


D A C A B
BAND OR DOT

OLD COLOR ARRANGEMENT


A B C D
BODY COLOR

NEW COLOR ARRANGEMENT

BODY COLOR (NEW COLOR ARRANGEMENT ONLY) INDICATES TYPE OF RESISTOR, AS FOLLOWS:—
BLACK — COMPOSITION, NON-INSULATED
TAN, OLIVE OR WHITE — COMPOSITION, INSULATED
DARK BROWN — WIRE-WOUND, INSULATED

TABLE OF PARTS

NOTE

Parts listed which are indicated by a # sign in column two are not available as spare parts and are listed for reference purposes only.

MODEL: Target Control Receiving Equipment RC-64-T9 **MAJOR ASSEMBLY: Radio Receiver and Selector BC-617-T2**

Reference Symbol	Army Stock No. Navy Stock No. British Ref. No.	Name of Part and Description	Function	Mfr. and Desig. or Standard Type	Cont. or Govt. Dwg. or Spec. No.
101	2X4-8885 — —	CRYSTAL: CR-1B/AR; 8885 K.C.; to provide specified performance over the —35° to 70°C (—3° to 102°F) temperature range.	Heterodyne oscillator control	23	
101	2X4-8075 — —	CRYSTAL: CR-1B/AR; 8075 K.C.; to provide specified performance over the —35° to 70°C (—3° to 102°F) temperature range.	Heterodyne oscillator control		
102	3ZK9692-20992 — —	SWITCH: SPST toggle switch; 3-ampere; 110-volt; AH&H #20992.	Squelch control	6	
104	2Z8799-239 — —	SOCKET: SO-239; antenna receptacle; single contact.	R-F line receptacle	4	
105	2Z8799-207 — —	SOCKET: SO-207; cable receptacle; two-contact; AN3102-18-3P.	Battery cable connector	4	
106	3Z8673.9 — —	SOCKET: Cable receptacle; three-contact; AN3102-18-5S.	Relay unit cable connector	4	
107	2Z8799-173 — —	SOCKET: SO-173; cable receptacle; four-contact; AN3102-20-4P.	Control cable connector	4	
108	2Z7124.1 — —	SOCKET: Cable receptacle; fourteen-contact; AN3102-20-1P.	Actuator Unit cable receptacle	4	
109-1	2ZK8678.36 — —	SOCKET: Tube socket; moulded bakelite; octal; Cinch #9900.	R-F amp. tube	9	
109-2		SOCKET: Same as Ref. 109-1.	Converter tube	9	
109-3		SOCKET: Same as Ref. 109-1.	First I-F amp. tube	9	
109-4		SOCKET: Same as Ref. 109-1.	Second I-F amp. tube	9	
109-5		SOCKET: Same as Ref. 109-1.	Limiter tube	9	
109-6		SOCKET: Same as Ref. 109-1.	Discriminator tube	9	
109-7		SOCKET: Same as Ref. 109-1.	Audio and control tube	9	

109-8		SOCKET: Same as Ref. 109-1.	Audio and sidetone tube	9	
109-9		SOCKET: Same as Ref. 109-1.	Oscillator tube	9	
109-10	2Z8761-27	SOCKET: Crystal; for CR-1B/AR Crystal Millen type 33102.	Crystal	9	P-10395
109-11		SOCKET: Same as Ref. 109-1.	#1 Channel tube	9	
109-12		SOCKET: Same as Ref. 109-1.	#2 Channel tube	9	
109-13		SOCKET: Same as Ref. 109-1.	#3 Channel tube	9	
109-14		SOCKET: Same as Ref. 109-1.	#4 Channel tube	9	
109-15		SOCKET: Same as Ref. 109-1.	#5 Channel tube	9	
109-16		SOCKET: Same as Ref. 109-1.	#6 Channel tube	9	
109-17		SOCKET: Same as Ref. 109-1.	#7 Channel tube	9	
109-18		SOCKET: Same as Ref. 109-1.	#8 Channel tube	9	
110-1	2ZK5598-8	JACK: Telephone jack; closed circuit; Utah #2A.	Limiter grid current	27	
110-2		JACK: Same as Ref. 110-1.	Discriminator current	27	
110-3		JACK: Same as Ref. 110-1.	Audio output meter jack	27	
111-1	2Z7272-186	POTENTIOMETER: Variable; carbon; 500,000-ohm; curve #6; Centralab #N-103, special.	#1 Channel volume control	8	
111-2		POTENTIOMETER: Same as Ref. 111-1.	#2 Channel volume control	8	
111-3		POTENTIOMETER: Same as Ref. 111-1.	#3 Channel volume control	8	
111-4		POTENTIOMETER: Same as Ref. 111-1.	#4 Channel volume control	8	
111-5		POTENTIOMETER: Same as Ref. 111-1.	#5 Channel volume control	8	
111-6		POTENTIOMETER: Same as Ref. 111-1.	#6 Channel volume control	8	
111-7		POTENTIOMETER: Same as Ref. 111-1.	#7 Channel volume control	8	
111-8		POTENTIOMETER: Same as Ref. 111-1.	#8 Channel volume control	8	
112	2Z7280.108	POTENTIOMETER: Variable; carbon; 5000-ohm; curve #1; Centralab NF-106, special.	Carrier relay control	8	
113	2Z7270.114	POTENTIOMETER: Variable; carbon; 50,000 ohm; curve #6; Centralab N-115, special.	Audio voltage control	8	
114	3HK1514-7	DYNAMOTOR: 14 volts at 4-ampere d-c input; 250 volts at 120-milliampere d-c output; temperature rise 40°C; continuous duty, 4000 rpm; Pioneer SP-125.	High voltage supply	21	
115	3H900-20-9	CIRCUIT BREAKER: Klixon #PM-20.	Low voltage over-load control	25	

TABLE OF PARTS (Continued)

NOTE

Parts listed which are indicated by a # sign in column two are not available as spare parts and are listed for reference purposes only.

MODEL: Target Control Receiving Equipment RC-64-T9

MAJOR ASSEMBLY: Radio Receiver and Selector BC-617-T2

Reference Symbol	Army Stock No. Navy Stock No. British Ref. No.	Name of Part and Description	Function	Mfr. and Desig. or Standard Type	Cont. or Govt. Dwg. or Spec. No.
116	3ZK1892-8 — —	FILTER: 4-section bandpass filter block; channel frequencies in cycles per second; 300, 420, 590, and 825; audio development; #B-505.	4-frequency bandpass	7	
117	3ZK1892-7 — —	FILTER: 4-section bandpass filter block; channel frequencies in cycles per second; 1155, 1620, 2270, and 3180, audio development; #B-504.	4-frequency bandpass	7	
118	3C525-4 — —	INDUCTOR: Air-core r-f inductor.	Low voltage line choke	2	A-3340
119	3C525-3 — —	INDUCTOR: Air-core r-f inductor.	Low voltage line choke	2	P-1777-3
120	3CK650 — —	R-F TRANSFORMER: Tuned transformer assembly; operating frequency 38.5 megacycles; air-core transformer, shielded.	Antenna transformer	12	A-3300
121	3CK650-2 — —	R-F TRANSFORMER: Tuned transformer assembly; operating frequency 38.549 megacycles; air-core transformer, shielded.	R-F amplifier transformer	12	A-3301
122	3CK650-1 — —	OSCILLATOR TRANSFORMER: Tune circuit assembly; fundamental 8885 kilocycles; harmonic amplifier 35.54 megacycles; air-core transformer, shielded.	Heterodyne voltage crystal oscillator	12	A-3302
123-1	2ZK9642-22 — —	I-F TRANSFORMER: Double-tuned transformer; operating frequency 3 megacycles; transformer, shielded; air-core.	I-F transformer first i-f amp.	12	A-3303
123-2		I-F TRANSFORMER: Same as Ref. 123-1.	I-F transformer second i-f amp.	12	
123-3		I-F TRANSFORMER: Same as Ref. 123-1.	I-F transformer limiter stage	12	
124	2C4417T2/C1 — —	DISCRIMINATOR: Transformer; same as Ref. 123-1.	I-F transformer disc. stage	12	A-184
125	3C341-6 — —	R-F INDUCTOR: 2.5-millihenry; 4-pie, h-f radio choke.	Discriminator isolator	19	P-10353
126	3CK316-29 — —	FILTER CHOKE: Iron core; enclosed; 3.5-henry at 100 milliamperes d.c.; Thord, #T45486.	High-voltage ripple finish	26	P-10356

127-1	3CK316-30	AUDIO CHOKE: Iron core; impregnated; 50-henry at 5 milliamperes d.c.; Thord, #45487.	Audio amplifier plate impedance	26	P-10357
127-2		AUDIO CHOKE: Same as Ref. 127-1.	Sidetone amplifier plate impedance	26	
128	3ZK9849.40	SWITCH: Cutler-Hammer #8801K4.	Overload safety switch	11	
130-1	4C7725-11	RELAY: SPST type 1-A contact assembly; operating current 4 milliamperes d.c.; coil resistance 6800 ohms; AAE. #-70702-1.	#1 Channel	3	P-10358
130-2		RELAY: Same as Ref. 130-1.	#2 Channel	3	
130-3		RELAY: Same as Ref. 130-1.	#3 Channel	3	
130-4		RELAY: Same as Ref. 130-1.	#4 Channel	3	
130-5		RELAY: Same as Ref. 130-1.	#5 Channel	3	
130-6		RELAY: Same as Ref. 130-1.	#6 Channel	3	
130-7		RELAY: Same as Ref. 130-1.	#7 Channel	3	
130-8		RELAY: Same as Ref. 130-1.	#8 Channel	3	
131	4C7725-7	RELAY: One make, one break contacts; operating current 4 milliamperes d-c; coil resistance 6800 ohms; AAE. #H-70702-7.	Carrier control	3	P-10366
140-1	3Z4450 or 3RC21BE104K	RESISTOR: Moulded carbon; 100,000-ohm; ±10%; ½-watt; pigtail; I.R.C. type BT-½.	Primary shunt in 123-1	14	
140-2		RESISTOR: Same as Ref. 140-1.	Secondary shunt in 123-1	14	
140-3		RESISTOR: Same as Ref. 140-1.	Primary shunt in 123-2	14	
140-4		RESISTOR: Same as Ref. 140-1.	Secondary shunt in 123-2	14	
140-5		RESISTOR: Same as Ref. 140-1.	Primary shunt in 123-3	14	
140-6		RESISTOR: Same as Ref. 140-1.	Secondary shunt in 123-4	14	
140-7		RESISTOR: Same as Ref. 140-1.	R-F Amp. grid	14	
140-8		RESISTOR: Same as Ref. 140-1.	R-F Amp. screen	13	
140-9		RESISTOR: Same as Ref. 140-1.	Converter screen	14	
140-10		RESISTOR: Same as Ref. 140-1.	First i-f grid return	14	
140-11		RESISTOR: Same as Ref. 140-1.	Limiter grid	14	
140-12		RESISTOR: Same as Ref. 140-1.	Limiter grid jack	14	
140-13		RESISTOR: Same as Ref. 140-1.	Primary shunt in 124	14	
140-14		RESISTOR: Same as Ref. 140-1.	Disc load	14	
140-15		RESISTOR: Same as Ref. 140-1.	Disc load	14	
141	3Z6030-40	RESISTOR: Moulded carbon; 300-ohm; ±10%; ⅓-watt; pigtails; IRC type.	R-F amp. cathode	14	

TABLE OF PARTS (Continued)

NOTE

Parts listed which are indicated by a # sign in column two are not available as spare parts and are listed for reference purposes only.

MODEL: Target Control Receiving Equipment RC-64-T9 **MAJOR ASSEMBLY: Radio Receiver and Selector BC-617-T2**

Reference Symbol	Army Stock No. Navy Stock No. British Ref. No.	Name of Part and Description	Function	Mfr. and Desig. or Standard Type	Cont. or Govt. Dwg. or Spec. No.
142-1	3Z4526 — —	RESISTOR: Moulded carbon; 2000-ohm; ±10%; pigtails; IRC type BTS ½-watt.	R-F amp. plate	14	
142-2		RESISTOR: Same as Ref. 142-1.	Converter plate	14	
142-3		RESISTOR: Same as Ref. 142-1.	Oscillator plate	14	
142-4		RESISTOR: Same as Ref. 142-1.	First i-f plate	14	
142-5		RESISTOR: Same as Ref. 142-1.	Second i-f plate	14	
142-6		RESISTOR: Same as Ref. 142-1.	Limiter plate	14	
143-1	3Z4664 or 3RC21BE152K —	RESISTOR: Moulded carbon; 1500-ohm; ±10%; ½-watt; pigtails; IRC type BTS.	Converter cathode	14	
143-2		RESISTOR: Same as Ref. 143-1.	Discriminator cathode	14	
143-3		RESISTOR: Same as Ref. 143-1.	#1 Channel amp. cathode	14	
143-4		RESISTOR: Same as Ref. 143-1.	#2 Channel amp. cathode	14	
143-5		RESISTOR: Same as Ref. 143-1.	#3 Channel amp. cathode	14	
143-6		RESISTOR: Same as Ref. 143-1.	#4 Channel 1 amp. cathode	14	
143-7		RESISTOR: Same as Ref. 143-1.	#5 Channel amp. cathode	14	
143-8		RESISTOR: Same as Ref. 143-1.	#6 Channel amp. cathode	14	
143-9		RESISTOR: Same as Ref. 143-1.	#7 Channel amp. cathode	14	
143-10		RESISTOR: Same as Ref. 143-1.	#8 Channel amp. cathode	14	
144-1	3Z4557 — —	RESISTOR: Moulded carbon; 25,000-ohm; ±10%; ½-watt; pigtails; IRC type BTS.	Converter injection grid return	14	
144-2		RESISTOR: Same as Ref. 144-1.	Limiter screen	14	
145-1	3Z4531 — —	RESISTOR: Moulded carbon; 50,000 ohm; ±10%; ½-watt; pigtails; IRC type BTS.	Shunt on crystal	14	
145-2		RESISTOR: Same as Ref. 145-1.	Oscillator screen	14	

145-4		RESISTOR: Same as Ref. 145-1.	Second i-f screen	14
145-5		RESISTOR: Same as Ref. 145-1.	Audio amp. plate	14
145-6		RESISTOR: Same as Ref. 145-1.	Audio voltage dropping	14
146-1	3Z6005-34	RESISTOR: Moulded carbon; 50-ohm; ±10%; ½-watt; pigtails; IRC type BTS.	First i-f cathode	14
146-2		RESISTOR: Same as Ref. 146-1.	Second i-f cathode	14
147-1	3Z6040-50	RESISTOR: Moulded carbon; 400-ohm; ±10%; ½-watt; pigtails; IRC type BTS.	First i-f cathode	14
147-2		RESISTOR: Same as Ref. 147-1.	Second i-f cathode	14
147-3		RESISTOR: Same as Ref. 147-1.	Limiter cathode	14
148-1	3Z4533	RESISTOR: Moulded carbon; 500,000-ohm; ±10%; ½-watt; pigtails; IRC type BTS.	AVC isolator	14
148-2		RESISTOR: Same as Ref. 148-1.	Audio discriminating network	14
148-3		RESISTOR: Same as Ref. 148-1.	Limiter grid jack	14
148-4		RESISTOR: Same as Ref. 148-1.	Carrier control tube grid isolator	14
148-5		RESISTOR: Same as Ref. 148-1.	Carrier control tube grid biasing	14
149	3Z4540	RESISTOR: Moulded carbon; 30,000-ohm; ±10%; 1-watt; pigtails; IRC type BTS.	Limiter plate and screen	14
150	3Z4579	RESISTOR: Vitreous enamel; wire-wound; 20-ohm center tapped; ±20%; Ohmite type BD-10.	Relay tube grid bias	20
151	3RC21BE154K	RESISTOR: Moulded carbon; 150,000-ohm; ±10%; ½-watt; pigtails; IRC type BTS.	Audio discriminating	14
152	3Z4542 or 3Z6802-9	RESISTOR: Moulded carbon; 2-megohms; ±10%; ½-watt; pigtails; IRC type BTS.	Audio discriminating network	14
153	3Z6075-23	RESISTOR: Moulded carbon; 750-ohm; ±10%; ½-watt; pigtails; IRC type BTS.	Audio and sidetone amp. cathode	14
154	3Z4530	RESISTOR: 20,000-ohm; ±10%; ½ watt; pigtails; IRC type BT-½.	Meter shunt resistor	14
160-1	3DA6-33.3	CAPACITOR: Moulded bakelite; mica; 300V .006-microfarad; ±20%.	Bypass in ant. transformer 120	1, 10, 17
160-2		CAPACITOR: Same as Ref. 160-1.	R-F amp. cathode	1, 10, 17
160-3		CAPACITOR: Same as Ref. 160-1.	Bypass in r-f transformer 121	1, 10, 17

TABLE OF PARTS (Continued)

NOTE

Parts listed which are indicated by a # sign in column two are not available as spare parts and are listed for reference purposes only.

MODEL: Target Control Receiving Equipment RC-64-T9

MAJOR ASSEMBLY: Radio Receiver and Selector BC-617-T2

Reference Symbol	Army Stock No. Navy Stock No. British Ref. No.	Name of Part and Description	Function	Mfr. and Desig. or Standard Type	Cont. or Govt. Dwg. or Spec. No.
160-4		CAPACITOR: Same as Ref. 160-1.	Converter cathode	1, 10, 17	
160-5		CAPACITOR: Same as Ref. 160-1.	Bypass in oscillator transformer 122	1, 10, 17	
160-6		CAPACITOR: Same as Ref. 160-1.	First i-f amp.	1, 10, 17	
160-7		CAPACITOR: Same as Ref. 160-1.	First i-f amp.	1, 10, 17	
160-8		CAPACITOR: Same as Ref. 160-1.	Bypass in second i-f transformer	1, 10, 17	
160-9		CAPACITOR: Same as Ref. 160-1.	Second i-f grid return	1, 10, 17	
160-10		CAPACITOR: Same as Ref. 160-1.	Second i-f amp. cathode	1, 10, 17	
160-11		CAPACITOR: Same as Ref. 160-1.	Bypass in limiter transformer 123-3	1, 10, 17	
160-12		CAPACITOR: Same as Ref. 160-1.	Limiter cathode	1, 10, 17	
160-13		CAPACITOR: Same as Ref. 160-1.	Bypass in disc. transformer 124	1, 10, 17	
160-14		CAPACITOR: Same as Ref. 160-1.	Dynamotor 1-V ripple filter	1, 10, 17	
160-15		CAPACITOR: Same as Ref. 160-1.	Battery line ripple filter	1, 10, 17	
160-16		CAPACITOR: Same as Ref. 160-1.	Bypass in first i-f transformer 123-1	1, 10, 17	
161-1	3DKA3-5.1 — —	CAPACITOR: Moulded bakelite; mica; 500V; .003-microfarad; ±10%.	R-F amp. screen	1, 10, 17	
161-2		CAPACITOR: Same as Ref. 161-1.	Converter screen	1, 10, 17	
161-3		CAPACITOR: Same as Ref. 161-1.	Oscillator screen	1, 10, 17	
161-4		CAPACITOR: Same as Ref. 161-1.	First i-f amp. screen	1, 10, 17	
161-5		CAPACITOR: Same as Ref. 161-1.	Second i-f amp. screen	1, 10, 17	
161-6		CAPACITOR: Same as Ref. 161-1.	Limiter screen	1, 10, 17	
162-1	3D9050-59.2 — —	CAPACITOR: Moulded bakelite; mica; 500V; .00005-microfarad; ±20%.	Coupling in r-f transformer 121	1, 10, 17	
162-2		CAPACITOR: Same as Ref. 162-1.	Coupling oscillator to converter	1, 10, 17	
162-3		CAPACITOR: Same as Ref. 162-1.	Bypass limiter grid return	1, 10, 17	
162-4		CAPACITOR: Same as Ref. 162-1.	Coupling in disc. transformer 124	1, 10, 17	

162-5		CAPACITOR: Same as Ref. 162-1.	Audio disc. network	1, 10, 17
162-6		CAPACITOR: Same as Ref. 162-1.	Dynamotor 1-V ripple network	1, 10, 17
163-1	3D9100-45 or 3K2010144 —	CAPACITOR: Moulded bakelite; mica; 500V; .0001-microfarad; ±20%.	Disc. load bypass	1, 10, 17
163-2		CAPACITOR: Same as Ref. 163-1.	Disc. load bypass	1, 10, 17
164	3DKA1-13.1 or 3K3010214 —	CAPACITOR: Moulded bakelite; mica; 500V; .001-microfarad; ±20%.	Audio disc. network	1, 10, 17
165-1	3DA50-39.1 — —	CAPACITOR: Metal cased; paper, oil-filled; 600V; .05-microfarad; ±20%.	Audio coupling	10, 15, 22
165-2		CAPACITOR: Same as Ref. 165-1.	Sidetone coupling	10, 15, 22
166	3DA100-90 — —	CAPACITOR: Metal cased; paper; oil-filled; 600V; .1-microfarad; ±20%.	Volume control coupling	10, 22
167-1	3DA500-27 — —	CAPACITOR: Metal cased; paper; oil-filled; 600V; .5-microfarad; ±20%.	#1 Channel relay bypass	10, 22
167-2		CAPACITOR: Same as Ref. 167-1.	#2 Channel relay bypass	10, 22
167-3		CAPACITOR: Same as Ref. 167-1.	#3 Channel relay bypass	10, 22
167-4		CAPACITOR: Same as Ref. 167-1.	#4 Channel relay bypass	10, 22
167-5		CAPACITOR: Same as Ref. 167-1.	#5 Channel relay bypass	10, 22
167-6		CAPACITOR: Same as Ref. 167-1.	#6 Channel relay bypass	10, 22
167-7		CAPACITOR: Same as Ref. 167-1.	#7 Channel relay bypass	10, 22
167-8		CAPACITOR: Same as Ref. 167-1.	#8 Channel relay bypass	10, 22
167-9		CAPACITOR: Same as Ref. 167-1.	Carrier relay bypass	10, 22
168	3DKB20-7.1 — —	CAPACITOR: Metal cased; electrolytic; three-section, consisting of two 20-microfarad 450-V sections and one 20-microfarad section; 25 Volts Mallory type FPT-339.		16
168-A		CAPACITOR: Part of 168; 20 microfarads; 450 volts.	Dynamotor h-v ripple filter	
168-B		CAPACITOR: Part of 168; 20 microfarads; 450 volts.	Audio amp. cathode.	
168-C		CAPACITOR: Part of 168; 20 microfarads; 25 volts.	Sidetone amp. cathode	
170-1	#	CAPACITOR: Variable; air; ceramic insulation; Sickles, type 2122.	Secondary tuning antenna transformer 120	24
170-2	#	CAPACITOR: Same as Ref. 170-1.	Primary tuning r-f transformer 121	24
171	#	CAPACITOR: Variable; air; double section; ceramic insulation; Sickles type 2123.		
171-A	#	CAPACITOR: One section 171.	Low frequency coil oscillator transformer 122	24
171-B	#	CAPACITOR: One section 171.	High frequency coil oscillator transformer 122	24

TABLE OF PARTS (Continued)

NOTE

Parts listed which are indicated by a # sign in column two are not available as spare parts and are listed for reference purposes only.

MODEL: Target Control Receiving Equipment RC-64-T9

MAJOR ASSEMBLY: Radio Receiver and Selector BC-617-T2

Reference Symbol	Army Stock No. Navy Stock No. British Ref. No.	Name of Part and Description	Function	Mfr. and Desig. or Standard Type	Cont. or Govt. Dwg. or Spec. No.
	#	CAPACITOR: Variable; air; double-section; ceramic insulation; Sickles type 2144.			
172-1A	#	CAPACITOR: One section.	Primary tuning, first i-f transformer 123-1	24	
172-1B	#	CAPACITOR: One section 172-1A.	Secondary tuning, first i-f transformer 123-1	24	
172-2	#	CAPACITOR: Same as Ref. 172-1.			
172-2A	#	CAPACITOR: One section 172-2.	Primary tuning, second i-f transformer 123-2	24	
172-2B	#	CAPACITOR: One section 172-2.	Secondary tuning, second i-f transformer 123-2	24	
172-3	#	CAPACITOR: Same as Ref. 172-1.			
172-3A	#	CAPACITOR: One section Ref. 172-3.	Primary tuning, limiter transformer 123-3	24	
172-3B	#	CAPACITOR: One section Ref. 172-3.	Secondary tuning, limiter transformer 123-3	24	
172-4	#	CAPACITOR: Same as Ref. 172-1.			
172-4A	#	CAPACITOR: One section 172-4.	Primary tuning, discriminator transformer 124	24	
172-4B	#	CAPACITOR: One section 172-4.	Secondary tuning, discriminator transformer 124	24	
180	#	COIL ASSEMBLY: Essex; 1½ turns primary, 5 turns secondary; on ¾" form with mounting.	Antenna transformer 120	12	
181	#	COIL ASSEMBLY: Essex; 4 turns on ¾" form with mounting.	R-F transformer 121	12	
182	#	INDUCTOR: 2½-millihenry Universal wound; 4 pie, r-f choke.	R-F transformer 121	12	
183	#	COIL ASSEMBLY: Essex; 15 turns low frequency winding; 4 turns high frequency winding; on ¾" form with mounting.	Part of oscillator transformer 122	12	
183-A	#	COIL ASSEMBLY: One section 122.	Low frequency winding	12	

183-B	#	COIL ASSEMBLY: One section 122.	High frequency winding	12	
184-1	#	COIL ASSEMBLY: Essex; two-section; universal winding; on ⅜" diameter ceramic form; 58 turns in each section.	First i-f transformer 123-1	12	
184-2	#	COIL ASSEMBLY: Same as Ref. 184-1.	Second i-f transformer 123-2	12	
184-3	#	COIL ASSEMBLY: Same as Ref. 184-1.	Limiter transformer 123-3	12	
185	#	COIL ASSEMBLY: Essex; two-section; universal winding; on ⅜" diameter ceramic form; each primary 32 turns, secondary 38 turns, tapped at midpoint.	Discriminator transformer 124	12	
	2Z9403.75 —— ——	BOARD: Terminal; 3 solder lug terminal; bakelite; two 0.1495" diameter holes on 1⅞" mounting centers; overall ⅛" x 1½" x 2⅜".			
	2Z9403.75 —— ——	BOARD: Terminal; 16 solder lug terminals; bakelite; two 0.1495" diameter holes on 3⁹⁄₃₂" mounting centers; overall ¹⁄₁₆" x 1⅜" x 3⅝".			
	2Z9432-7 —— ——	BOARD: Terminal; 32 solder lug terminals; two 0.1495" diameter holes on 5¹¹⁄₃₂" mounting centers; overall ¹⁄₁₆" x 1⅜" x 5¹¹⁄₁₆".			
	3HK1514-7B19 —— ——	BRUSH SET: Electrical contact; includes h.v. positive; h.v. negative; l.v. positive; l.v. negative; for Pioneer type SP-125 dynamotor; (4 per set).			
	3HK1514-7/C1 —— ——	CAP: Contact brush; bakelite; round; ¼" long x 1¹⁄₁₆" OD x ⁷⁄₁₆" ID; Pioneer type GE #SP-125.			
	2Z7588-54/1 —— ——	CONTACTS: Relay; for Agastat relay in Relay Unit BC-418-Z.			
	6L53013N —— ——	FASTENER: Snapslide; spring washer .005" x ⅜.			
	2Z5821-7 —— ——	KNOB: Lever; pointer type; 1³⁄₁₆" long x ⅝" high, base portion; ½" at back, tapered to point in front; ¼" hole in center.			
	6Z4914 —— ——	GROMMET: Rubber; for ¼" hole.			P-10066
	6Z4856-1 —— ——	GROMMET: Rubber; for ⅜" hole.			P-10385
	6Z4877-9 —— ——	GROMMET: Rubber; for ½" hole.			P-10384
	3HK1514-7/B20 —— ——	HOLDER: Contact brush; tubular 1" long x ⁷⁄₁₆" OD x ¼" ID; bakelite insulation.	Contact brush		
	2Z6820.20 —— ——	MOUNT: Vibration; Lord type, 150-P10; normal rating 10 pounds; 1½" long skirt, 1¾" square; mounting holes on 1⅜" centers; rubber cushion 1½" long x ⅝" thick.			
	6L34024 —— ——	WASHER: Crash; aluminum; flat; 1½" OD x 1⁷⁄₆₄" ID x 0.064" thick.			

TABLE OF PARTS (Continued)

NOTE

Parts listed which are indicated by a # sign in column two are not available as spare parts and are listed for reference purposes only.

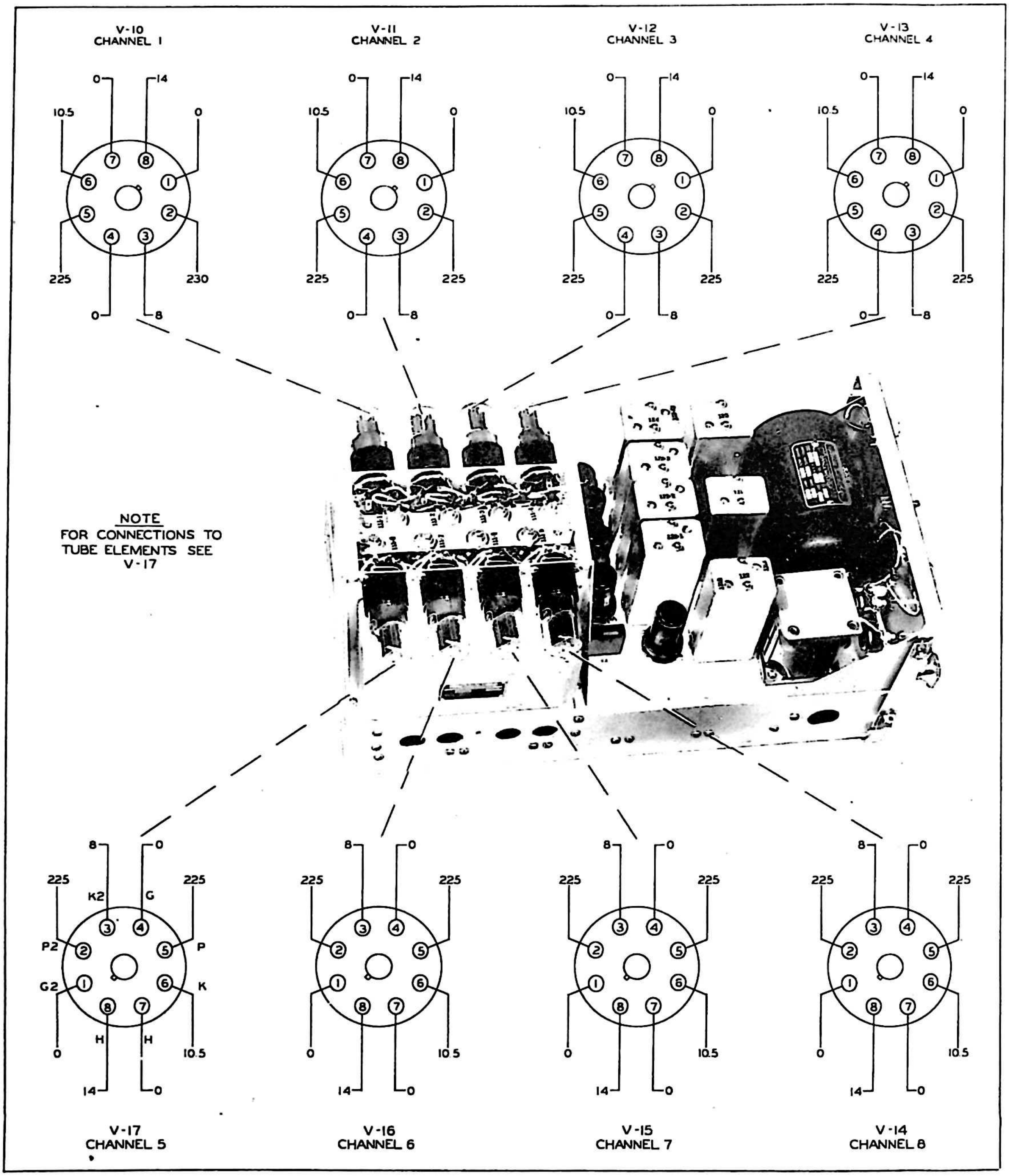
MODEL: Target Control Receiving Equipment RC-64-T9 **MAJOR ASSEMBLY: Relay Unit BC-418-Z**

Reference Symbol	Army Stock No. Navy Stock No. British Ref. No.	Name of Part and Description	Function	Mfr. and Desig. or Standard Type	Cont. or Govt. Dwg. or Spec. No.
24-1	2Z8673.9 — —	SOCKET: Cable receptacle; three contact; AN3102-18-5S.	Relay unit cable connector	3	
24-2		SOCKET: Same as Ref. 24-1.	Safety cable connector	3	
23-1	3DA500-27 — —	CONDENSER: Metal-cased paper; oil-filled; 600 volts; ±20%; .5 microfarad.	Relay contact bypass	10	
23-2		CONDENSER: Same as Ref. 23-1.	Relay contact bypass	10	
22	2Z788-54 — —	RELAY: Agastat type NA-29B; magnet coil; .2 volts d.c.; contacts 5 amperes 12 volt d.c.; time delay 20 seconds; Auto Elec. H-77246.	Time interval delay	5	
	2Z5987 — —	LIGHT: Indicator; complete assembly; consists of bracket, lampholder, and jewel; Mallory type B-310-R.	For holding carrier indicator bulb	16	
	2Z5883-37 — —	PILOT LIGHT BRACKET: Same as above, but Mallory type B-310-G.	For holding relay indicator bulb	16	P-10380
21-1	2Z5933 — —	BULB: LM-33; Mazda #57; 12-16 volt; min. bayonet base; single contact bulb G4-½.	Indicates carrier on	13	
21-2		BULB: Same as Ref. 21-1.	Indicates delay relay on	13	
	2Z8799-173 — —	SOCKET: Cable receptacle; four contact; AN3102-20-4P.	Control cable connector	3	
	3Z9845-5	SWITCH: C-H #8801-K3.	Filament and plate supply control	11	
	2Z5534 — —	JACK: Telephone jack; JK-34-A; small open circuit.	Audio input monitoring	16	
		PILOT LIGHT BRACKET: Mallory #B-310-G.	For holding power indicator bulb	16	
	2Z5933.1 — —	BULB: Lamp Mazda #53; bayonet type, 12 volt.	Light indicates filament and power on	13	
	2Z7270.114 — —	POTENTIOMETER: Variable carbon; 50,000 ohms; curve #6; ⅜" shaft; Centralab #N-115.	Audio voltage control	8	
	2Z6820.20 — —	MOUNT: Vibration; square piece of rubber, ⅜" x ⅜" x ½" with hole ½" long; steel stud 0.34" diameter x 1 7/32" long with notch 5/32" from one end.			

MANUFACTURERS

1. Aerovox Corporation.
2. Air Communications, Inc.
3. American Auto Electric Co.
4. American Phenolic Co.
5. American Gas Accumulator Co.
6. Arrow, Hart & Hageman Co.
7. Audio Development Co.
8. Centralab Mfg. Co.
9. Cinch Mfg. Co.
10. Cornell-Dubilier Electric Co.
11. Cutler-Hammer, Inc.
12. Essex Electronics Co.
13. General Electric Co.
14. International Resistance Co.
15. Lafayette Radio Co.
16. P. R. Mallory Co.
17. Micamold Radio Corporation.
18. James Millen Mfg. Co.
19. National Co., Inc.
20. Ohmite Mfg. Co.
21. Pioneer Gen-E-Motor Co.
22. Potter Company.
23. Reeves Sound Laboratories.
24. F. W. Sickles Co.
25. Spencer Thermostat Co.
26. Thordarson Electric Co.
27. Utah Radio Products Co.

SECTION VIII
DRAWINGS


V-10
CHANNEL 1
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14
10.5
0
7
8
6
1
5
2
4
3
225
230
0
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V-11
CHANNEL 2
0
14
10.5
0
225
225
0
8
V-12
CHANNEL 3
0
14
10.5
0
225
225
0
8
V-13
CHANNEL 4
0
14
10.5
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225
225
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8
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225
225
K2
G
3
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P2
2
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P
G2
1
6
K
8
7
H
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0
10.5
14
0
V-17
CHANNEL 5
8
0
225
225
0
10.5
14
0
V-16
CHANNEL 6
8
0
225
225
0
10.5
14
0
V-15
CHANNEL 7
8
0
225
225
0
10.5
14
0
V-14
CHANNEL 8

NOTE
FOR CONNECTIONS TO
TUBE ELEMENTS SEE
V-17

Figure 8-1. Radio Receiver and Selector BC-617-T2—Socket Voltages of Selector Section

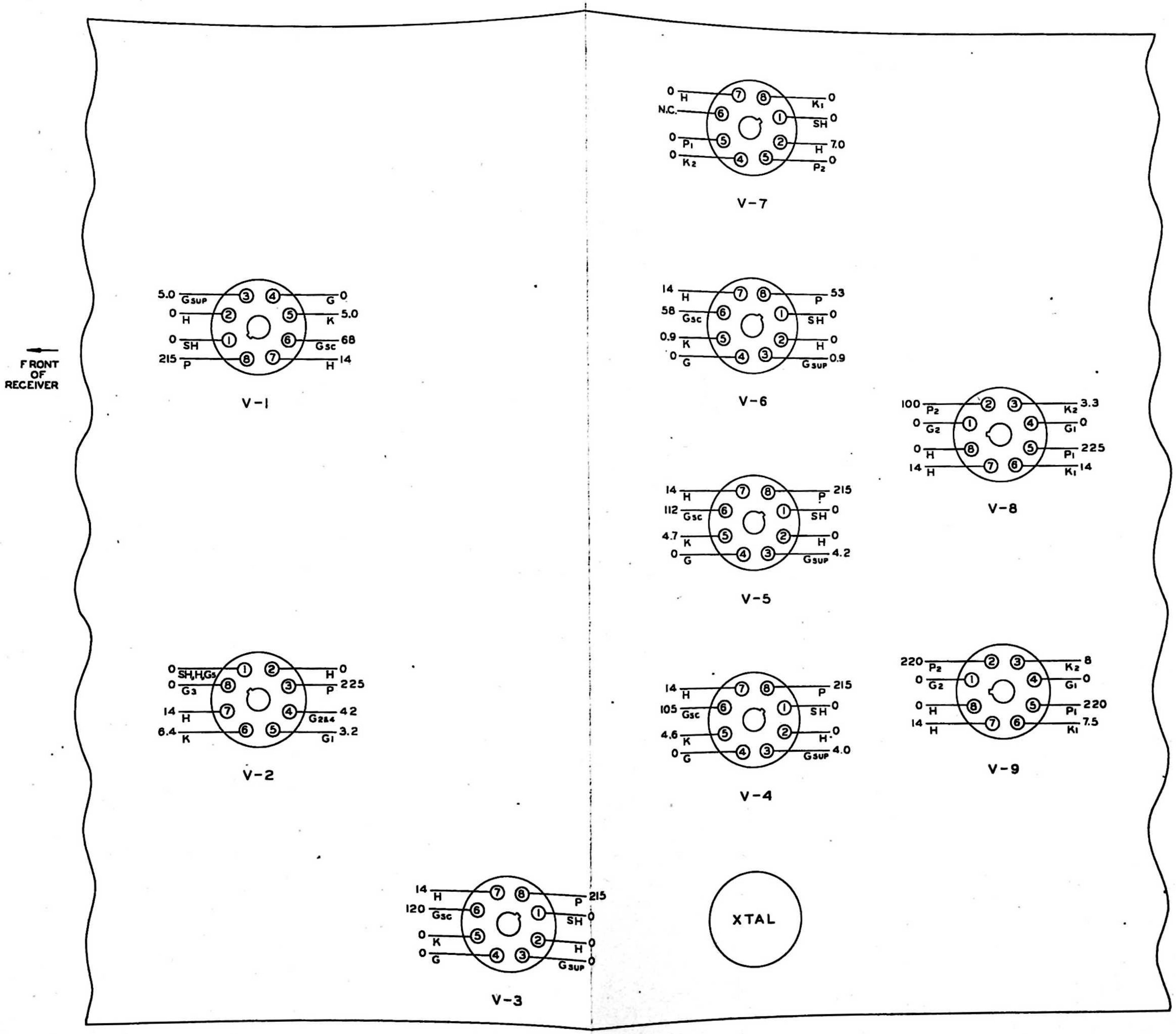

FRONT OF RECEIVER
V-1
5.0 Gsup
0 G
0 H
K 5.0
0 SH
Gsc 68
215 P
H 14
V-2
0 SH, H, G5
H 0
0 G3
P 225
14 H
G2&4 42
6.4 K
G1 3.2
V-3
14 H
P 215
120 Gsc
SH 0
0 K
H 0
0 G
Gsup 0
V-7
0 H
K1 0
N.C.
SH 0
0 P1
H 7.0
0 K2
P2 0
V-6
14 H
P 53
58 Gsc
SH 0
0.9 K
H 0
0 G
Gsup 0.9
V-5
14 H
P 215
112 Gsc
SH 0
4.7 K
H 0
0 G
Gsup 4.2
V-4
14 H
P 215
105 Gsc
SH 0
4.6 K
H 0
0 G
Gsup 4.0
XTAL
V-8
100 P2
K2 3.3
0 G2
G1 0
0 H
P1 225
14 H
K1 14
V-9
220 P2
K2 8
0 G2
G1 0
0 H
P1 220
14 H
K1 7.5

Figure 8-2. Radio Receiver and Selector BC-617-T2—Socket Voltages of Receiver Section

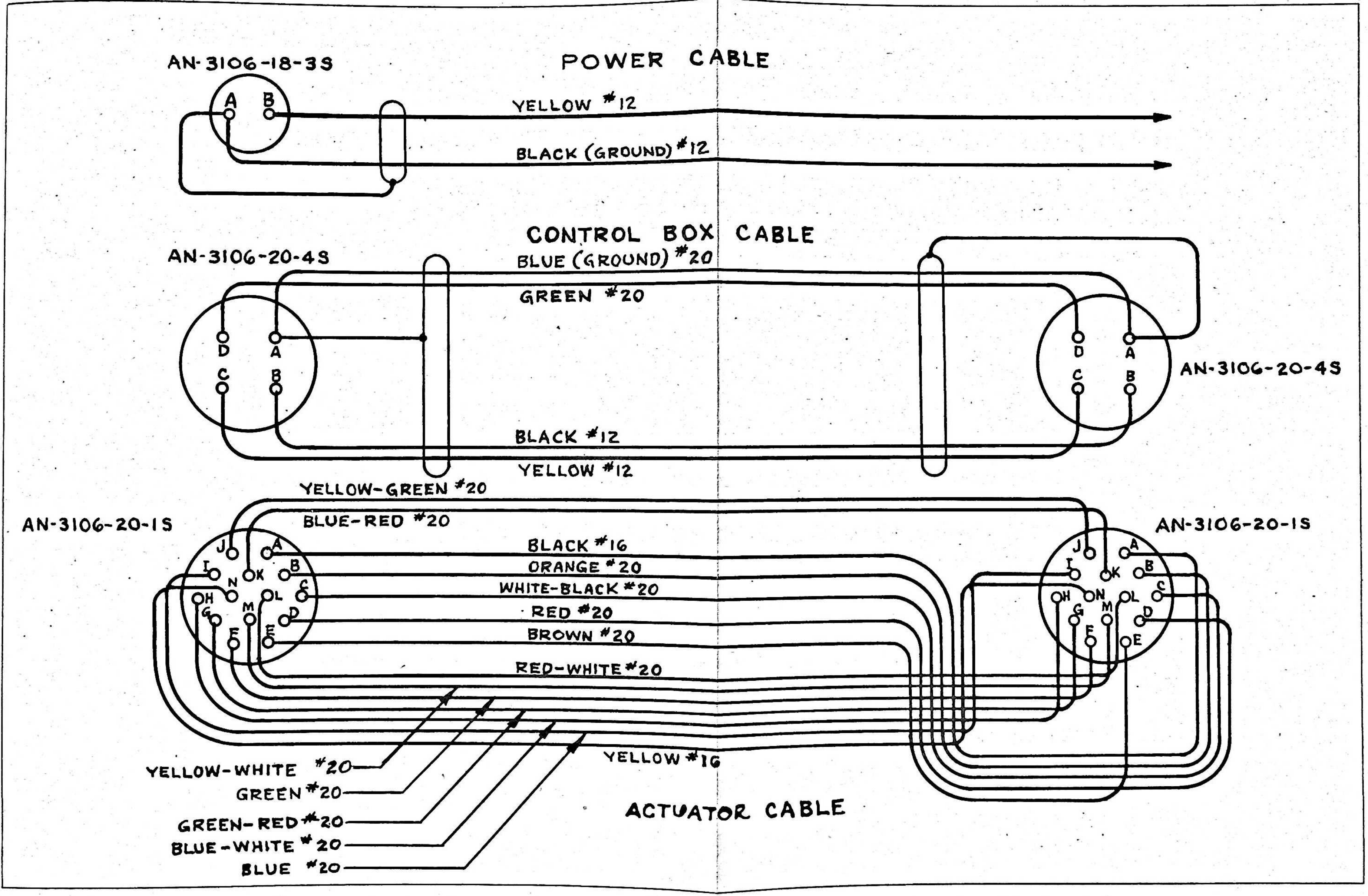

POWER CABLE
AN-3106-18-3S
A
B
YELLOW #12
BLACK (GROUND) #12
CONTROL BOX CABLE
AN-3106-20-4S
BLUE (GROUND) #20
GREEN #20
D
A
C
B
BLACK #12
YELLOW #12
AN-3106-20-4S
YELLOW-GREEN #20
BLUE-RED #20
AN-3106-20-1S
BLACK #16
ORANGE #20
WHITE-BLACK #20
RED #20
BROWN #20
RED-WHITE #20
AN-3106-20-1S
J
A
I
B
N
K
C
H
L
G
M
D
F
E
YELLOW-WHITE #20
GREEN #20
GREEN-RED #20
BLUE-WHITE #20
BLUE #20
YELLOW #16
ACTUATOR CABLE

Figure 8-3. Target Control Receiving Equipment RC-64-T9—Cable Wiring

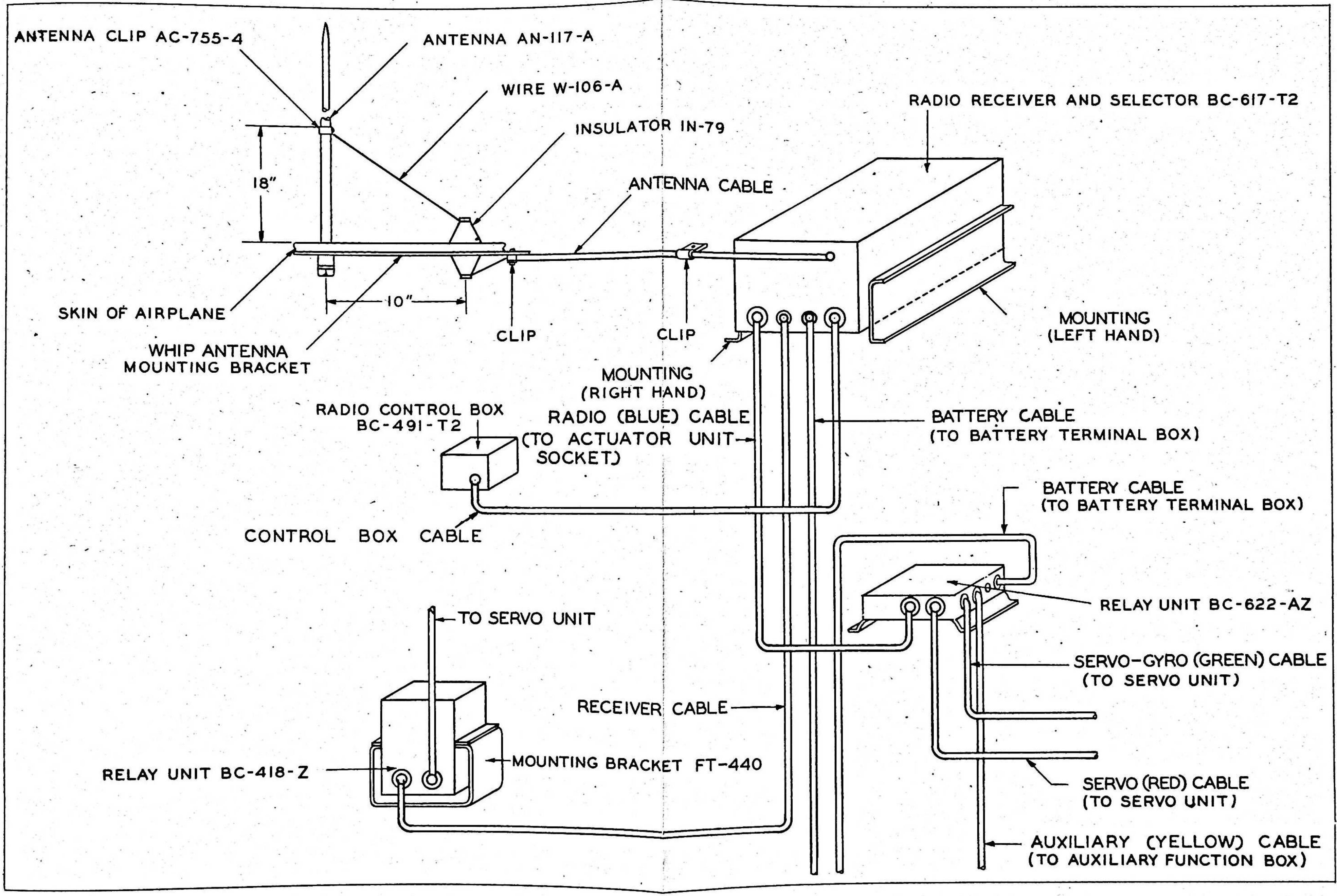

ANTENNA CLIP AC-755-4
ANTENNA AN-117-A
WIRE W-106-A
INSULATOR IN-79
18"
ANTENNA CABLE
RADIO RECEIVER AND SELECTOR BC-617-T2
SKIN OF AIRPLANE
10"
CLIP
CLIP
WHIP ANTENNA MOUNTING BRACKET
MOUNTING (LEFT HAND)
MOUNTING (RIGHT HAND)
RADIO CONTROL BOX BC-491-T2
RADIO (BLUE) CABLE (TO ACTUATOR UNIT SOCKET)
BATTERY CABLE (TO BATTERY TERMINAL BOX)
CONTROL BOX CABLE
BATTERY CABLE (TO BATTERY TERMINAL BOX)
RELAY UNIT BC-622-AZ
TO SERVO UNIT
SERVO-GYRO (GREEN) CABLE (TO SERVO UNIT)
RECEIVER CABLE
RELAY UNIT BC-418-Z
MOUNTING BRACKET FT-440
SERVO (RED) CABLE (TO SERVO UNIT)
AUXILIARY (YELLOW) CABLE (TO AUXILIARY FUNCTION BOX)

Figure 8-4. Target Control Receiving Equipment RC-64-T9—Cording Diagram

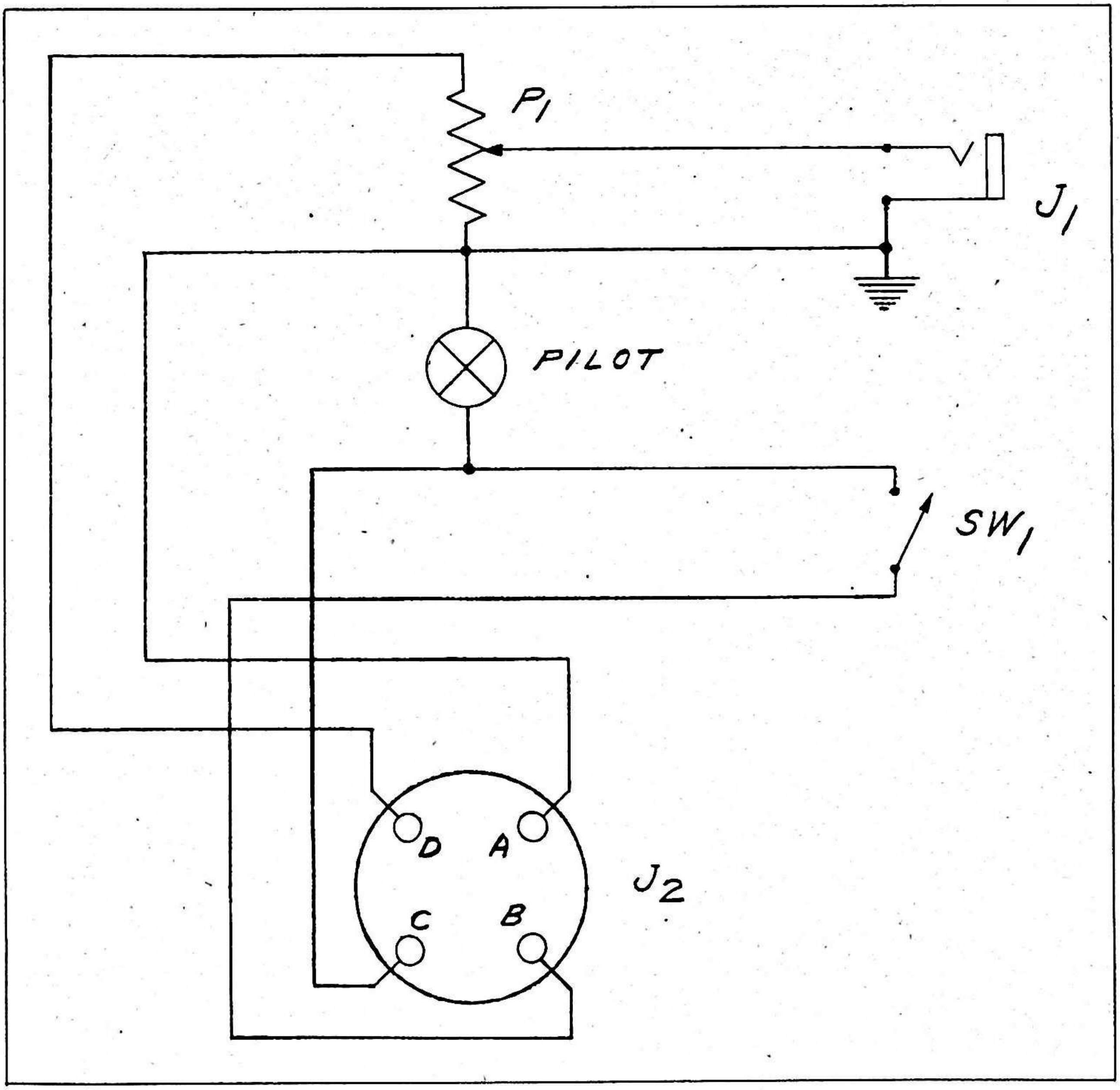
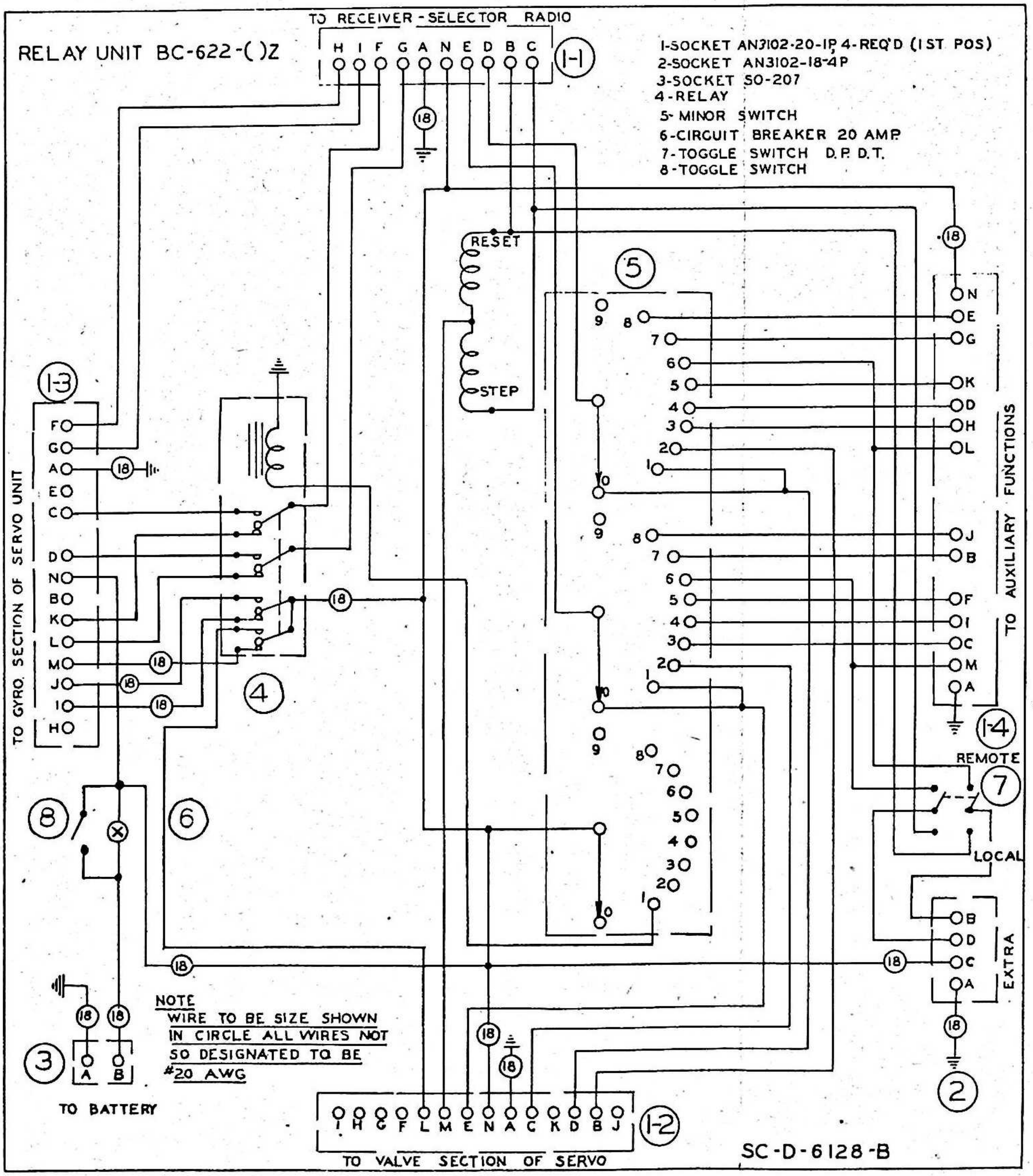

P1
J1
PILOT
SW1
D
A
C
B
J2

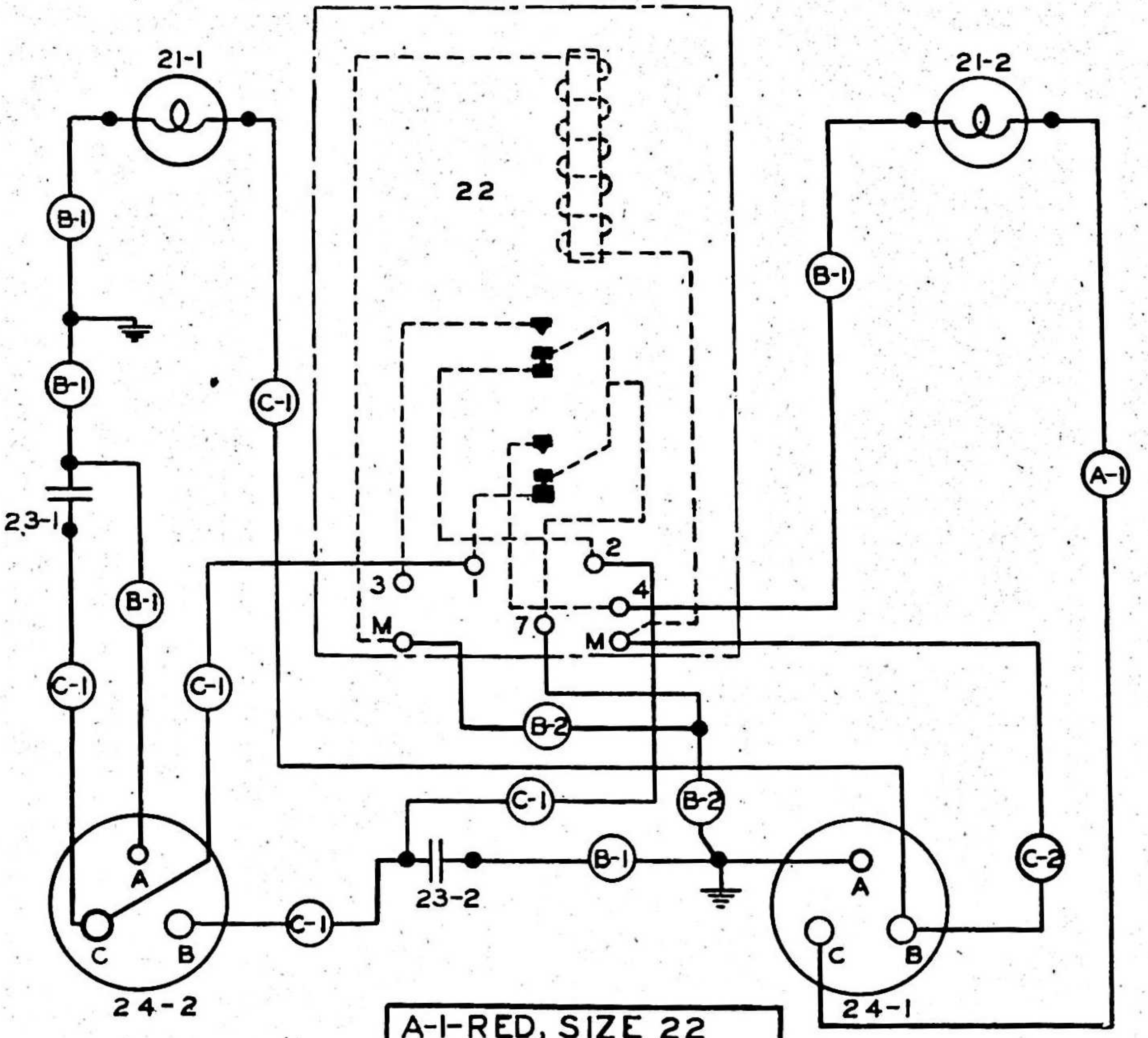
Figure 8-5. Radio Control Box BC-491-T2—Schematic Diagram


RELAY UNIT BC-622-( )Z
TO RECEIVER-SELECTOR RADIO
H I F G A N E D B C
1-1
1-SOCKET AN3102-20-1P, 4-REQ'D (1ST POS)
2-SOCKET AN3102-18-4P
3-SOCKET SO-207
4-RELAY
5- MINOR SWITCH
6-CIRCUIT BREAKER 20 AMP.
7-TOGGLE SWITCH D.P. D.T.
8-TOGGLE SWITCH
RESET
STEP
5
18
N E G K D H L J B F I C M A
TO AUXILIARY FUNCTIONS
1-4
REMOTE
7
LOCAL
B D C A
EXTRA
2
1-3
F G A E C D N B K L M J I H
TO GYRO SECTION OF SERVO UNIT
4
8
6
3
A B
TO BATTERY
NOTE
WIRE TO BE SIZE SHOWN IN CIRCLE ALL WIRES NOT SO DESIGNATED TO BE #20 AWG
I H G F L M E N A C K D B J
1-2
TO VALVE SECTION OF SERVO
SC-D-6128-B

INDIVIDUAL PINS LEAD TO THE FOLLOWING		
SOCKET 1-1	A- GROUND	IN RADIO
	B- #1 RELAY	
	C- #2 RELAY	
	D- #3 RELAY	
	E- #4 RELAY	
	F- #5 RELAY	
	G- #6 RELAY	
	H- #7 RELAY	
	I - #8 RELAY	
	N- +12 VOLTS	
SOCKET 1-2	A- GROUND	
	B- BRAKE VALVE-ON	
	C- BRAKE VALVE-OFF	
	D- FAST	THROTTLE
	E- SLOW	
	L- CENTER RUDDER TRIM MOTOR	
	M- NEG RETURN FROM MICRO. SWITCH	
	N- +12 VOLTS	
SOCKET 1-3	A- GROUND	
	C- ROLL MOTOR-RIGHT	(AILERON)
	D- ROLL MOTOR-LEFT	(AILERON)
	F- PITCH MOTOR-UP	(ELEVATOR)
	G-PITCH MOTOR-DOWN	(ELEVATOR)
	I- UNCAGED DIR GYRO	
	J- CAGED DIR. GYRO	
	K- RIGHT RUDDER TRIM	
	L- LEFT RUDDER TRIM	
	M- CENTER AIL. TRIM MOTOR	
	N- +12 VOLTS	
SOCKET 1-4	A- GROUND	
	C- DEC. PITCH	
	D- UP-FLAPS	
	F- DOWN LANDING GEAR	
	L- EXTRA INCREASE	
	B- OFF	
	G- ON	
	H- INC PITCH	
	I- DOWN FLAPS	
	K- UP LANDING GEAR	
	M- EXTRA DECREASE	
	N- +12 VOLTS	
	E- MIXTURE, RICH	
	J- MIXTURE, LEAN	
SOCKET 2	A- GROUND	
	C- +12 VOLTS	
	B- ANY EXTRA FUNCTION	
	D- ANY EXTRA FUNCTION.	
SOCKET 3	A- -12 VOLTS	
	B- +12 VOLTS	

Figure 8-6. Relay Unit BC-622-AZ—Schematic Diagram

RELAY UNIT BC-418-Z


21-1
21-2
22
B-1
C-1
A-1
B-2
C-2
23-1
23-2
3
1
2
4
7
M
M
A
B
C
24-2
24-1

A-1-RED, SIZE 22
B-1-BLACK, SIZE 22
B-2-BLACK, SIZE 18
C-1-YELLOW, SIZE 22
C-2-YELLOW, SIZE 18

21-1-LAMP LM-33 (CARRIER RELAY)
21-2-LAMP LM-33 (DELAY RELAY)
22-RELAY AGASTAT NA-29B OR AUTOMATIC ELECTRIC H-77246
23- CAPACITOR .5 MFD. 600 V. (2 USED)
24-1-RECEPTACLE (RECEIVER) AN 3102-18-5S
24-2-RECEPTACLE (SAFETY) AN 3102-18-5S

Figure 8-7. Relay Unit BC-418-Z—Schematic Diagram

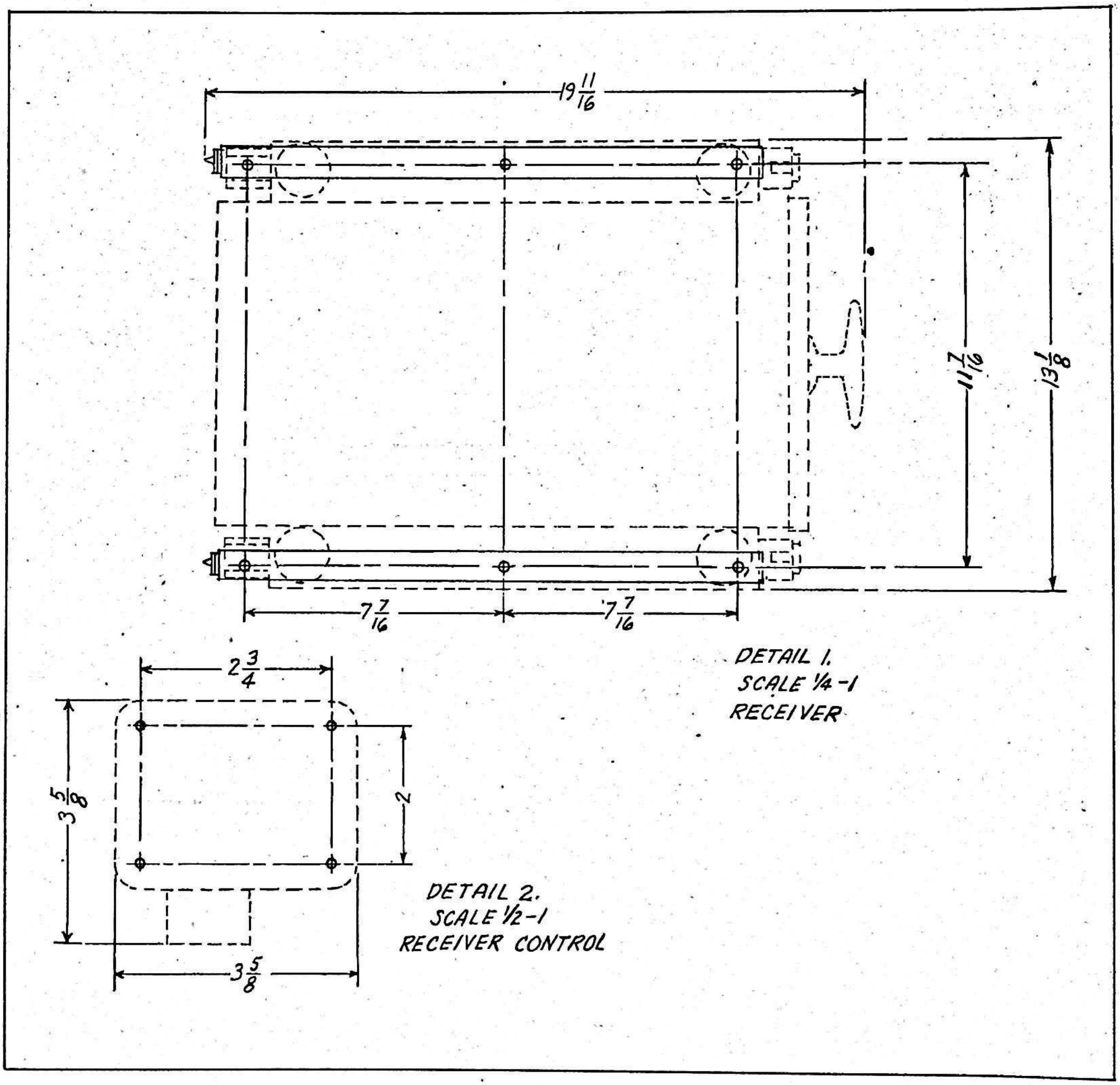

19 11/16
11 7/16
13 1/8
7 7/16
7 7/16
DETAIL 1.
SCALE 1/4-1
RECEIVER
2 3/4
3 5/8
2
3 5/8
DETAIL 2.
SCALE 1/2-1
RECEIVER CONTROL

Figure 8-8. Radio Receiver and Selector BC-617-T2 and Radio Control Box BC-491-T2—Outline Dimensions

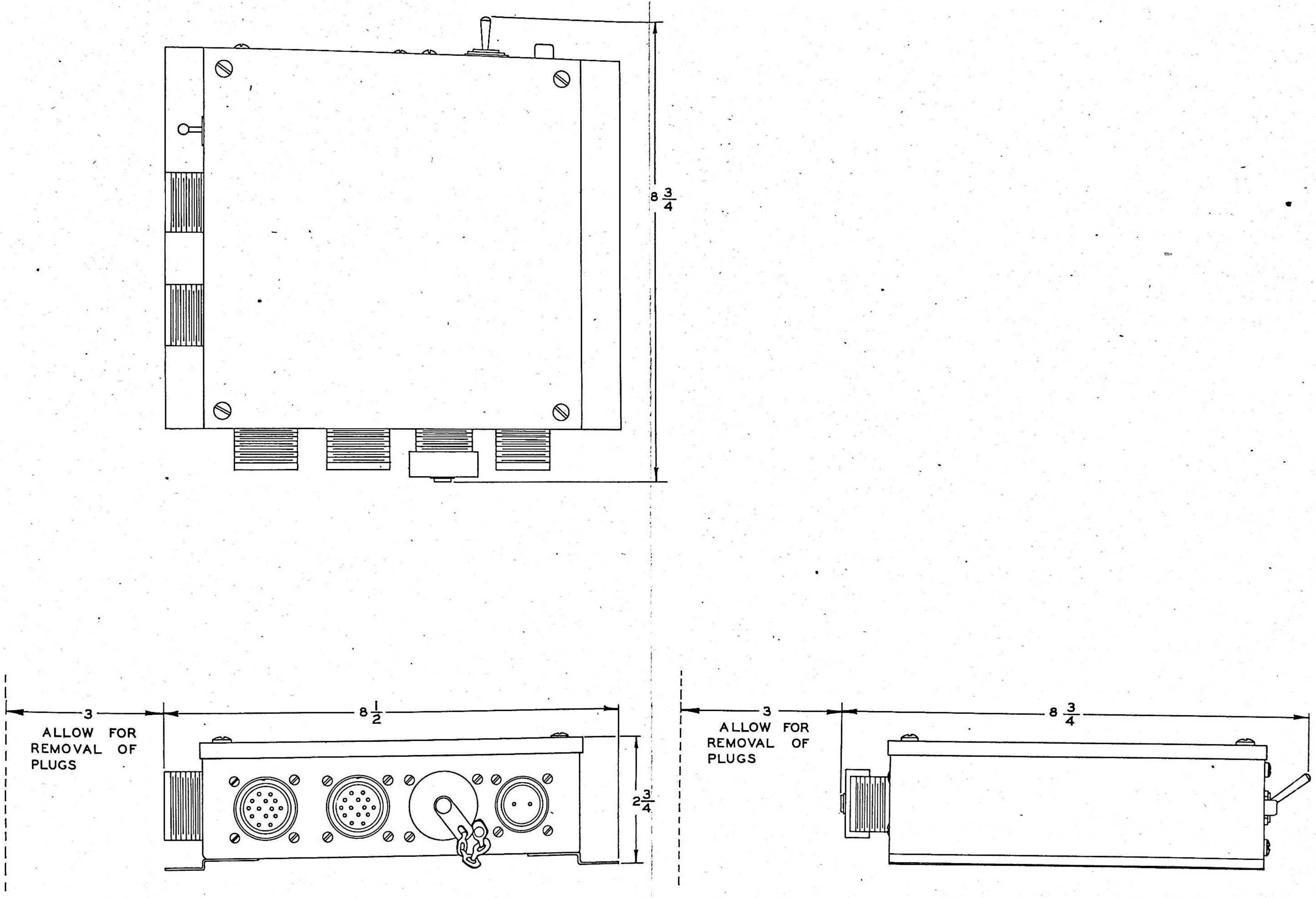
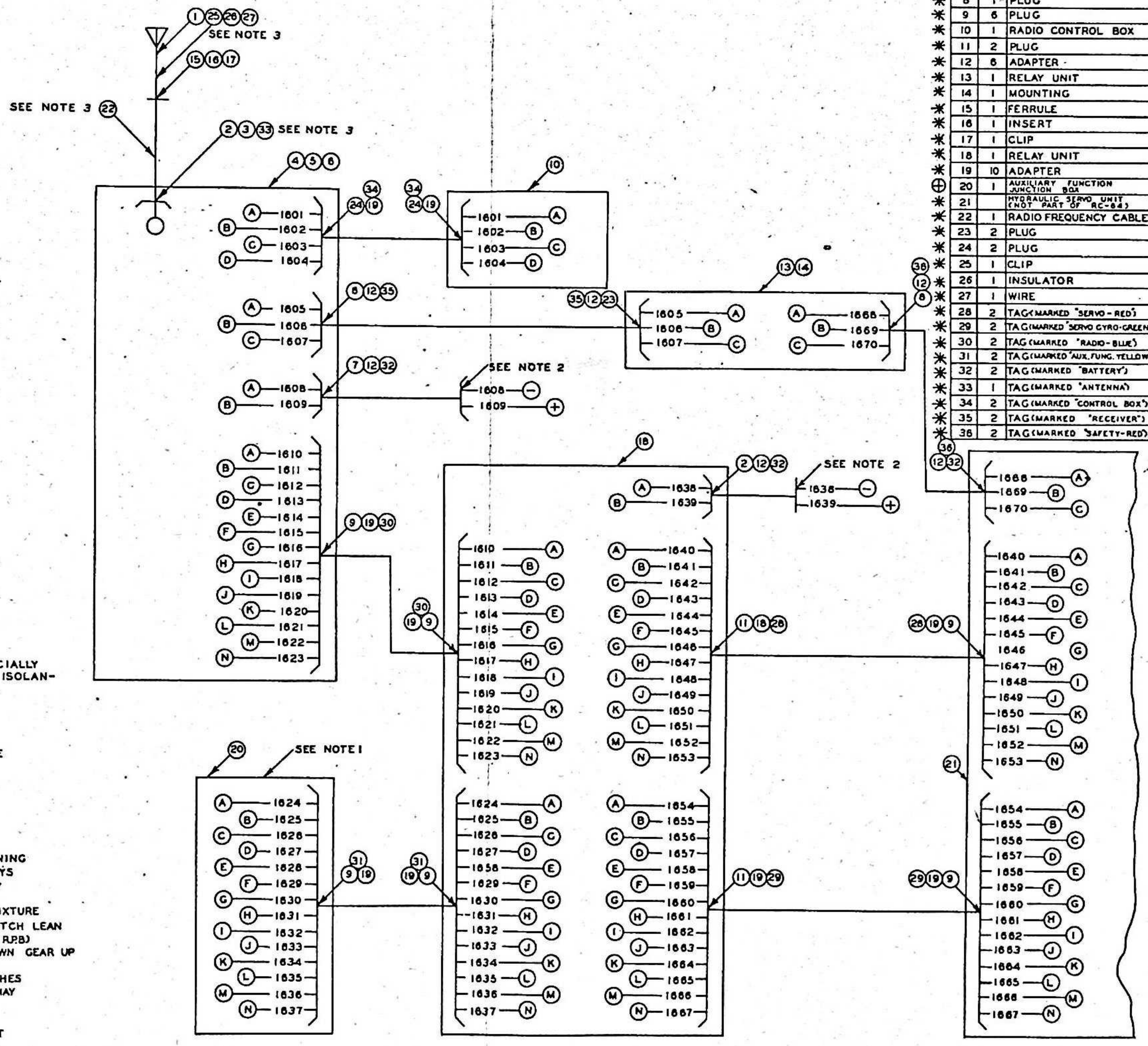

8 3/4
3
ALLOW FOR
REMOVAL OF
PLUGS
8 1/2
2 3/4
3
ALLOW FOR
REMOVAL OF
PLUGS
8 3/4

Figure 8-9. Relay Unit BC-622-AZ—Dimensional Drawing

WIRE TABLE			
1601	18	1638	12
1602	12	1639	12
1603	12	1640	18
1604	18	1641	20
1605	18	1642	20
1606	18	1643	20
1607	18	1644	20
1608	12	1645	20
1609	12	1646	20
1610	18	1647	20
1611	20	1648	20
1612	20	1649	20
1613	20	1650	20
1614	20	1651	20
1615	20	1652	20
1616	20	1653	18
1617	20	1654	18
1618	20	1655	20
1619	20	1656	20
1620	20	1657	20
1621	20	1658	20
1622	20	1659	20
1623	18	1660	20
1624	18	1661	20
1625	20	1662	20
1626	20	1663	20
1627	20	1664	20
1628	20	1665	20
1629	20	1666	20
1630	20	1667	18
1631	20	1668	18
1632	20	1669	18
1633	20	1670	18
1634	20		
1635	20		
1636	20		
1637	18		

ALL WIRES SHALL BE AIRCRAFT CABLE PER SPEC. AN-J-C-48, UNLESS OTHERWISE SPECIFIED.

	ITEM	REQ'D	DESCRIPTION	TYPE NO.
✳	1	1	ANTENNA	AN-117-A
✳	2	1	PLUG	PL-259
✳	3	1	ADAPTER	M-359
✳	4	1	RECEIVER AND SELECTOR	BC-617-72
✳	5	1	MOUNTING	RIGHT HAND
✳	6	1	MOUNTING	LEFT HAND
✳	7	2	PLUG	AN 3106-18-3S
✳	8	1	PLUG	AN 3106-18-5P
✳	9	6	PLUG	AN 3106-20-1S
✳	10	1	RADIO CONTROL BOX	BC-491-T2
✳	11	2	PLUG	AN 3108-20-1S
✳	12	6	ADAPTER	AN 3057-10
✳	13	1	RELAY UNIT	BC-418
✳	14	1	MOUNTING	FT-440
✳	15	1	FERRULE	
✳	16	1	INSERT	SEE NOTE 5
✳	17	1	CLIP	AC-755
✳	18	1	RELAY UNIT	BC-622-AZ
✳	19	10	ADAPTER	AN-3057-12
⊕	20	1	AUXILIARY FUNCTION JUNCTION BOX	
✳	21		HYDRAULIC SERVO UNIT (NOT PART OF RC-64)	SEE NOTE 4
✳	22	1	RADIO FREQUENCY CABLE	RG-11/U
✳	23	2	PLUG	AN-3108-18-5P
✳	24	2	PLUG	AN-3106-20-4S
✳	25	1	CLIP	AC-755-4
✳	26	1	INSULATOR	IN-79
✳	27	1	WIRE	W-106-A
✳	28	2	TAG (MARKED "SERVO-RED")	
✳	29	2	TAG (MARKED "SERVO GYRO-GREEN")	AC-650-1
✳	30	2	TAG (MARKED "RADIO-BLUE")	AC-650-1
✳	31	2	TAG (MARKED "AUX. FUNC. YELLOW")	AC-650-1
✳	32	2	TAG (MARKED "BATTERY")	AC-650-1
✳	33	1	TAG (MARKED "ANTENNA")	AC-650-1
✳	34	2	TAG (MARKED "CONTROL BOX")	AC-650-1
✳	35	2	TAG (MARKED "RECEIVER")	AC-650-1
✳	36	2	TAG (MARKED "SAFETY-RED")	AC-650-1


①㉕㉖㉗ SEE NOTE 3
⑮⑯⑰
SEE NOTE 3 ㉒
②③㉝ SEE NOTE 3
④⑤⑥
㉞ ㉔⑲
㉞ ㉔⑲
⑩
1601 A
1602 B
1603 C
1604 D
⑥⑫㉟
㉟⑫㉓
⑬⑭
㊱ ⑫ ⑧
1605 A
1606 B
1607 C
1668 A
1669 B
1670 C
⑦⑫㉜
SEE NOTE 2
1608 −
1609 +
1610 1611 1612 1613 1614 1615 1616 1617 1618 1619 1620 1621 1622 1623
A B C D E F G H I J K L M N
⑨⑲㉚
㉚ ⑲⑨
⑱
②⑫㉜
SEE NOTE 2
1638 A
1639 B
1638 −
1639 +
㊱ ⑫㉜
1640 1641 1642 1643 1644 1645 1646 1647 1648 1649 1650 1651 1652 1653
⑪⑲㉘
㉘⑲⑨
㉑
⑳
SEE NOTE I
1624 1625 1626 1627 1628 1629 1630 1631 1632 1633 1634 1635 1636 1637
㉛ ⑨⑲
㉛ ⑲⑨
1654 1655 1656 1657 1658 1659 1660 1661 1662 1663 1664 1665 1666 1667
⑪⑲㉙
㉙⑲⑨

5 INSERT (ITEM 6) MAY BE OBTAINED COMMERCIALLY IN ACCORDANCE WITH DWG. SC-D-6025 FROM ISOLANTITE INC. BELLEVILLE, NEW JERSEY, OR EQUAL.

4 THE HYDRAULIC SERVO UNIT IS PART OF THE AIRCRAFT.

3 FOR COMPLETE ANTENNA INSTALLATION INSTRUCTIONS SEE DRAWING.

2 CONNECT TO D.C. POWER SOURCE.

1 AUXILIARY FUNCTION JUNCTION BOX CONTAINING THE NECESSARY ELECTRICAL LATCHING RELAYS TO PERFORM THE FOLLOWING FUNCTIONS BY REMOTE CONTROL.
A-GROUND D-FLARS UP G-ON J-MIXTURE
B-OFF E-MIXTURE RICH H-INCREASE PITCH LEAN
C-PITCH DECREASE F-LANDING GEAR (DECREASE R.P.B.)
K-LANDING (INCREASE R.P.M.) DOWN I-FLAPS DOWN GEAR UP
NO FUNCTION SHALL DRAW MORE THAN ONE (1) AMPERE FROM RELAY UNIT BC-622 ANY SWITCHES FOR LOCAL CONTROL OF THESE FUNCTIONS MAY BE OPERATED FROM THE SAME BOX.

✳ INDICATES GOVERNMENT FURNISHED EQUIPMENT
⊕ INDICATES CONTRACTOR FURNISHED ITEMS.

Figure 8-10. Target Control Receiving Equipment RC-64-T9—Interconnecting Wiring Diagram

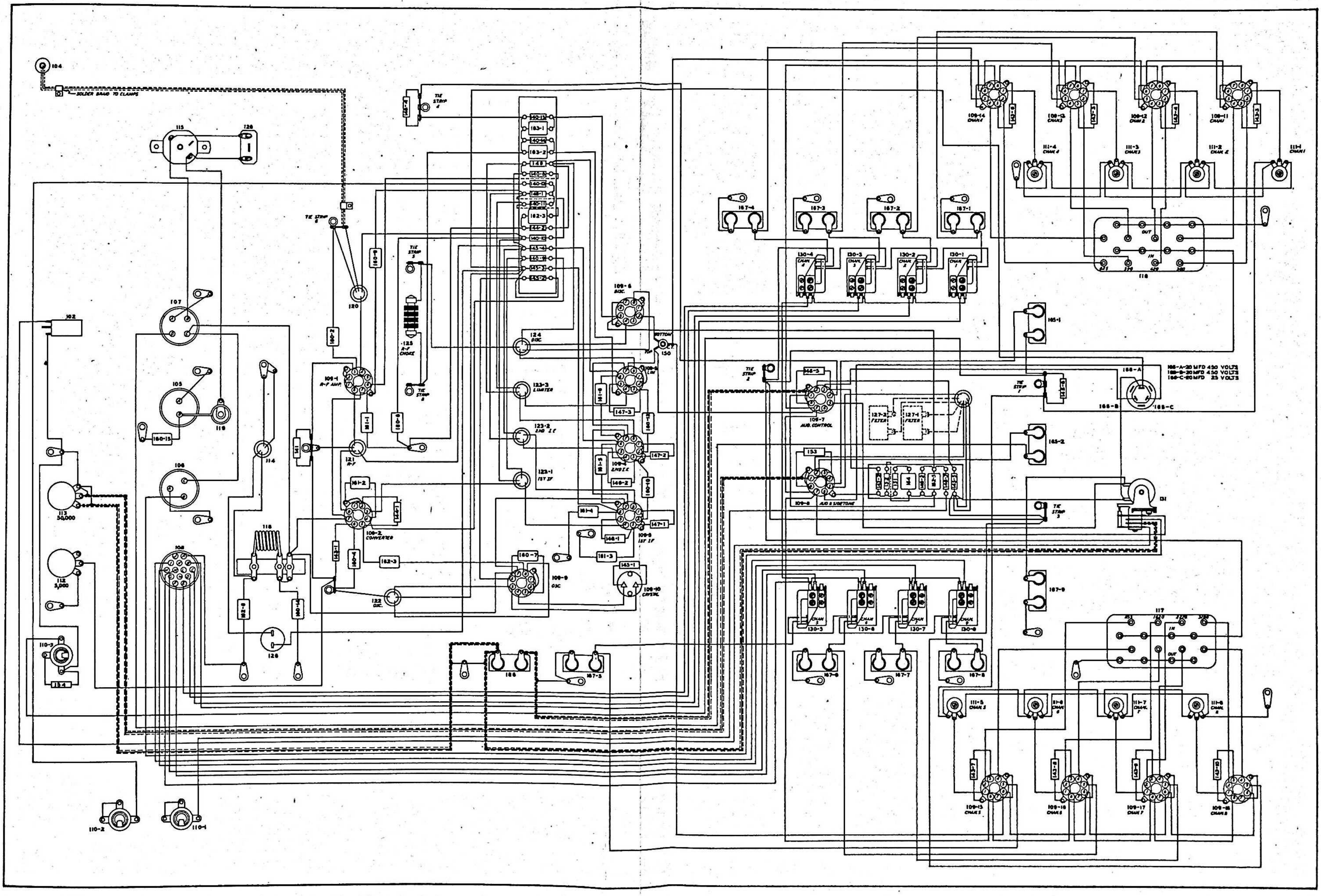
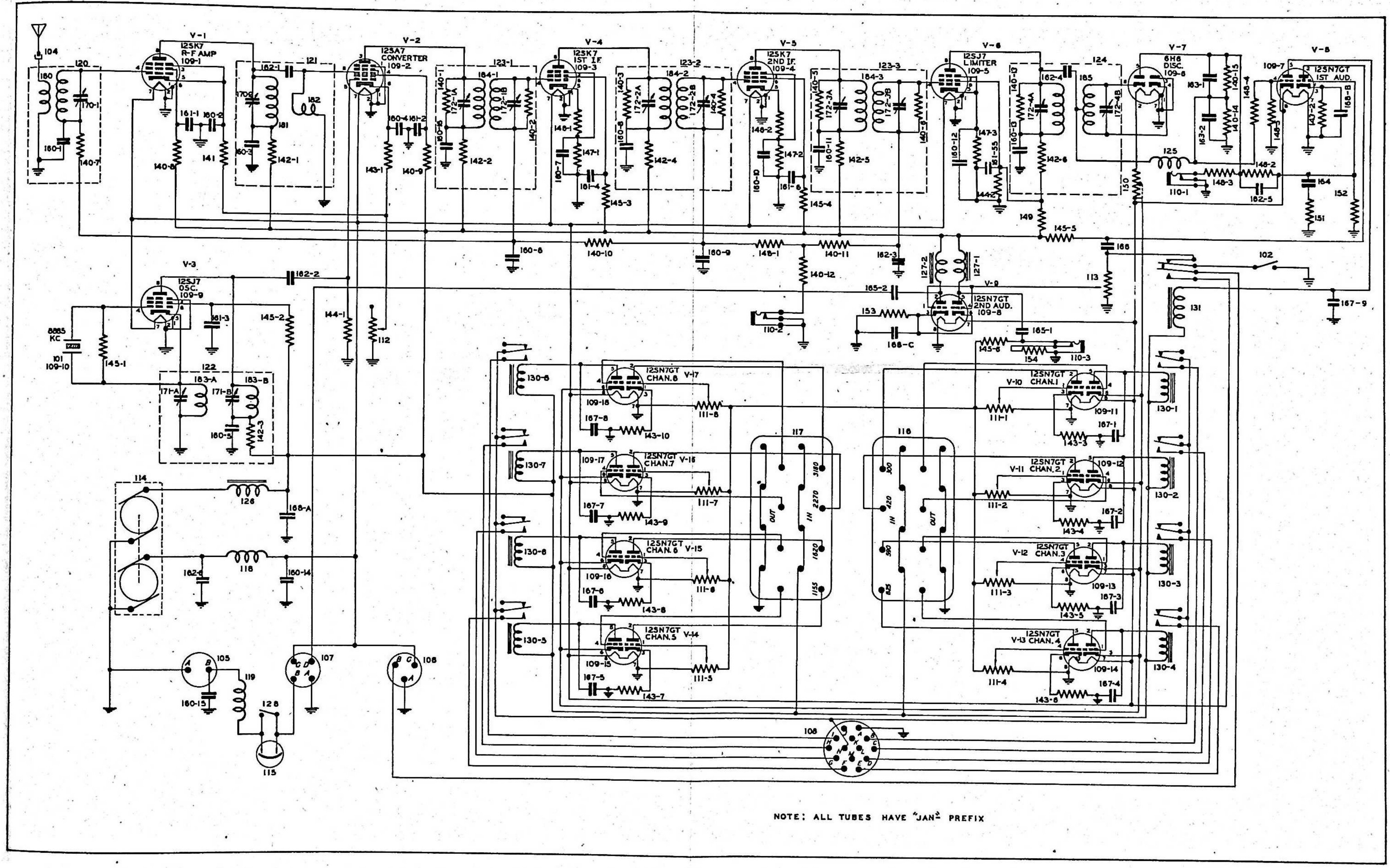

104
SOLDER BAND TO CLAMPS
115
128
TIE STRIP 4
TIE STRIP 6
TIE STRIP 5
TIE STRIP 8
140-13
183-1
140-14
183-2
148
140-6
140-12
148-1
140-11
182-3
144-2
140-10
145-4
140-9
145-3
145-2
107
105
119
160-15
106
102
113
50,000
112
5,000
110-3
154
108
118
114
126
120
160-9
160-2
109-1
R-F AMP.
121
R-F
161
161-2
109-2
CONVERTER
143-2
182-3
122
OSC.
125
R-F CHOKE
124
DISC.
123-3
LIMITER
123-2
2ND I.F.
123-1
1ST I.F.
109-6
DISC.
109-5
LIM
109-4
2ND I.F.
109-3
1ST I.F.
147-3
147-2
147-1
149-2
149-1
146-1
181-3
161-4
160-7
109-9
OSC.
143-1
109-10
CRYSTAL
BOTTOM
TOP
150
186
167-5
110-2
110-1
109-14
CHAN. 4
109-13
CHAN. 3
109-12
CHAN. 2
109-11
CHAN. 1
111-4
CHAN. 4
111-3
CHAN. 3
111-2
CHAN. 2
111-1
CHAN. 1
167-4
167-3
167-2
167-1
130-4
CHAN. 4
130-3
CHAN. 3
130-2
CHAN. 2
130-1
CHAN. 1
OUT
IN
116
165-1
TIE STRIP 2
146-3
109-7
AUD. CONTROL
127-2
FILTER
127-1
FILTER
TIE STRIP 1
168-A
168-B
168-C
168-A-20 MFD 450 VOLTS
168-B-20 MFD 450 VOLTS
168-C-20 MFD 25 VOLTS
165-2
153
109-8
AUD & SIDETONE
131
TIE STRIP 3
167-9
130-5
CHAN. 5
130-6
CHAN. 6
130-7
CHAN. 7
130-8
CHAN. 8
167-6
167-7
167-8
117
IN
OUT
111-5
CHAN. 5
111-6
CHAN. 6
111-7
CHAN. 7
111-8
CHAN. 8
109-15
CHAN. 5
109-16
CHAN. 6
109-17
CHAN. 7
109-18
CHAN. 8

Figure 8-11. Radio Receiver and Selector BC-617-T2—Practical Wiring Diagram


V-1
12SK7
R-F AMP
109-1
V-2
12SA7
CONVERTER
109-2
V-4
12SK7
1ST I.F.
109-3
V-5
12SK7
2ND I.F.
109-4
V-6
12SJ7
LIMITER
109-5
V-7
6H6
DISC.
109-6
V-8
12SN7GT
1ST AUD.
109-7
V-3
12SJ7
OSC.
109-9
8865 KC
101
109-10
V-9
12SN7GT
2ND AUD.
109-8
12SN7GT
CHAN. 8
V-17
109-18
12SN7GT
CHAN. 7
V-16
109-17
12SN7GT
CHAN. 6
V-15
109-16
12SN7GT
CHAN. 5
V-14
109-15
12SN7GT
CHAN. 1
V-10
109-11
12SN7GT
CHAN. 2
V-11
109-12
12SN7GT
CHAN. 3
V-12
109-13
12SN7GT
CHAN. 4
V-13
109-14
117
118
OUT
IN
3180
2270
1620
1155
300
420
580
825
104
120
121
122
123-1
123-2
123-3
124
125
126
118
119
128
114
115
105
107
106
108
102
113
131
130-1
130-2
130-3
130-4
130-5
130-6
130-7
130-8
110-1
110-2
110-3

NOTE: ALL TUBES HAVE "JAN" PREFIX

Figure 8-12. Radio Receiver and Selector BC-617-T2—Schematic Drawing